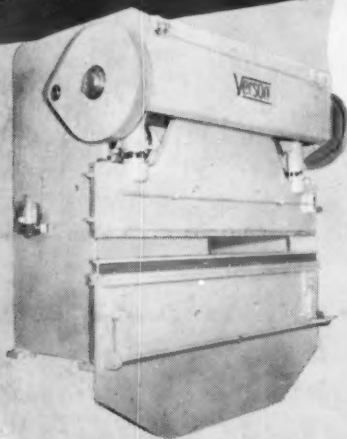


MODERN Machine Shop

AUGUST, 1954

*If you
form, bend,
or punch metal...*

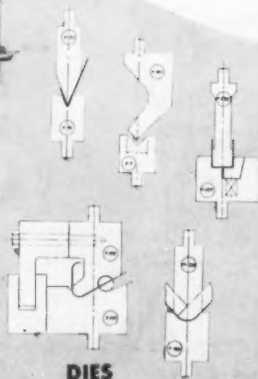


PRESS BRAKES

*Take Advantage
of the complete*



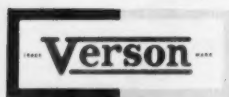
**PRESS BRAKE
AND DIE SERVICE**



DIES



TECHNICAL
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ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION
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MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES



Machine vs. muscle — a duel to the death!

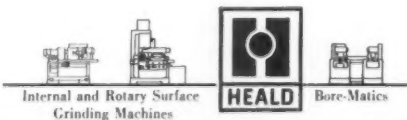
COMPETITION was mighty rough on the great Jawn Henry, famed steel-driving rock driller of the last century. For he pitted his strength against a steam-driven drill and *won*—only to die, hours later, from the strain. And the steam drill (later converted to air) replaced all hand methods of drilling rock.

The old order changes, yielding place to new and better ways of doing things. For competition and progress go hand in hand.

In today's highly competitive market, it's important that improved production methods be utilized to the fullest possible extent. That's where we can help. For Heald offers a potent combination of fresh thinking and sound experience in every phase of precision finishing. New developments in automation, way-type and transfer Bore-Matics,

interchangeable tooling and improved internal grinding methods are just a few of the ways in which Heald may be able to solve your specific problems.

Competition is wonderful when you're *ahead* of it. Our business is to keep you there. That's why IT PAYS TO COME TO HEALD.



THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

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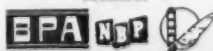
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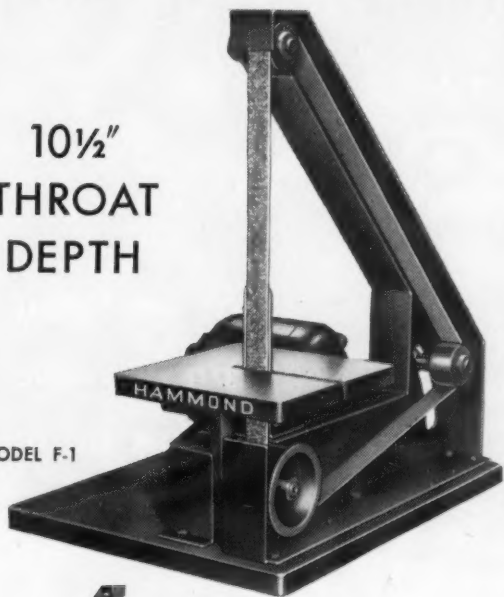
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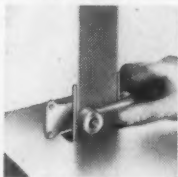
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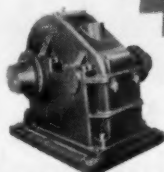
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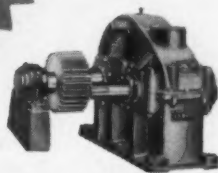


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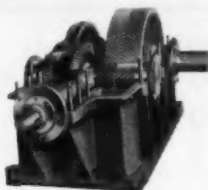
THE SPEED REDUCER *Most likely to Succeed* IN YOUR PLANT



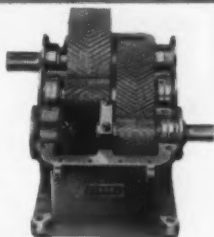
Heavy duty single reduction unit



Unit with pinion on extended shaft



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Standard double reduction unit

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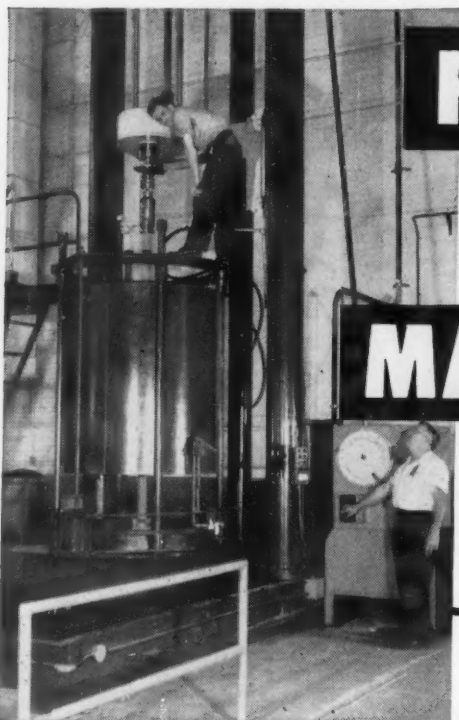
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FB-923



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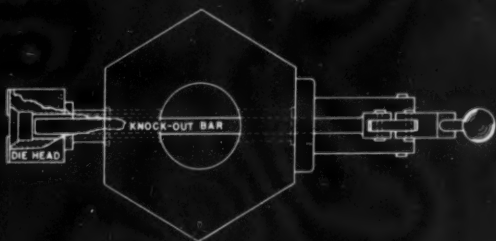
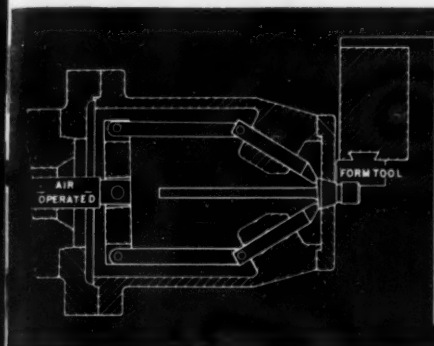
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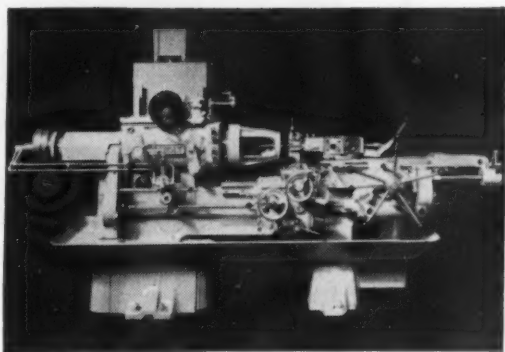


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Here's a turbine blade job. It is a tough job to hold because there are a number of different blades, each of different length, and the work must be located and held against a tapered surface. It requires a special fixture. An air-operated plunger through the spindle forces the taper against the locating seat on the fixture, holding all sizes firmly.

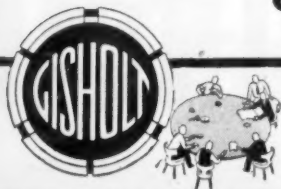
The machining is done on the shank end. It must be turned and faced and necked for thread relief. Form tools on the rear of the cross slide handle all this in a single pass. Threading is done from the turret and a hand-operated knock-out bar loosens the blade from the fixture after the threading is completed. Production is more than adequate to meet the contract requirements.

Gisholt Engineers have been specialists in turret lathe work for over 60 years.



Gisholt lathes are ideal for high speed work of this kind. With hydraulic spindle control, the Gisholt Speed Selector, and many other automatic features, operating time and effort are reduced to a minimum. Ask for literature.

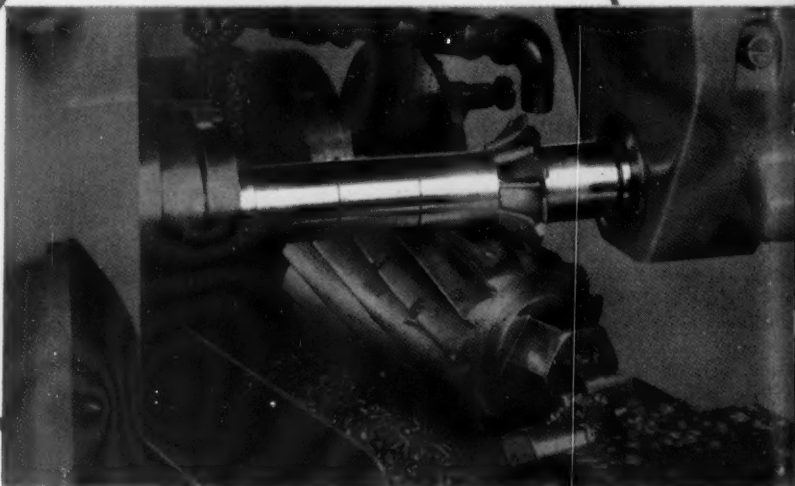
GISHOLT MACHINE COMPANY
MADISON 10, WISCONSIN



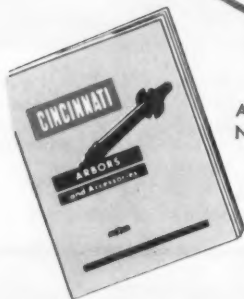
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Cincinnati



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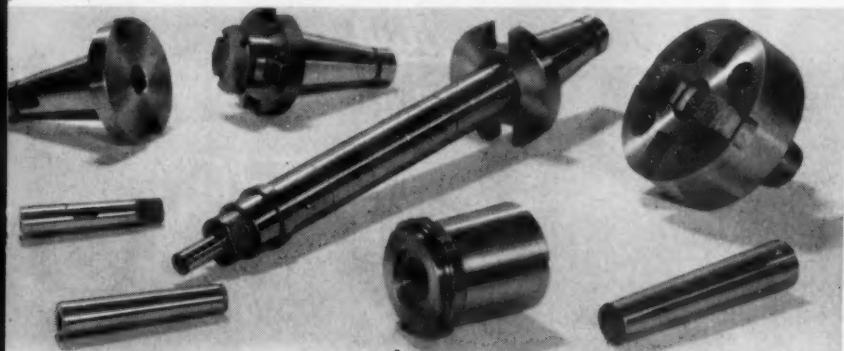
Ask for catalog
No. M-1664-4



CINCIN

Arbors

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MILLING MACHINES



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THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

NATI

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OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID**



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- Table feeds—per minute, 5 16" to 20"
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COMPANY
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Name

Title

☐ Send data on Knight's 20" & 42" Rotary Tables.

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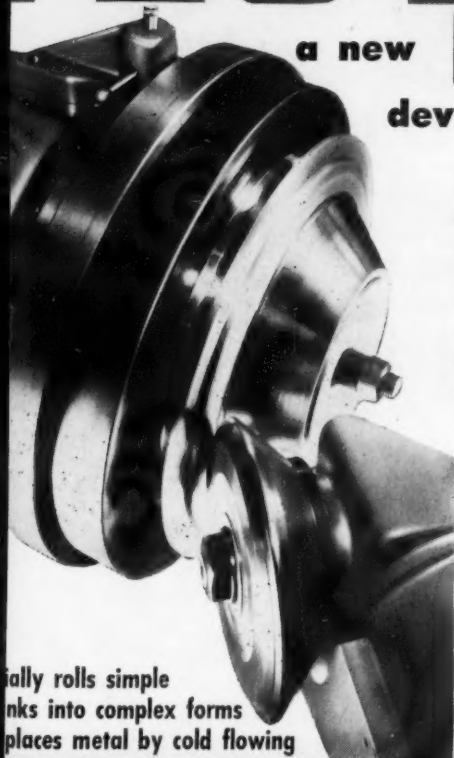
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FLOTURN

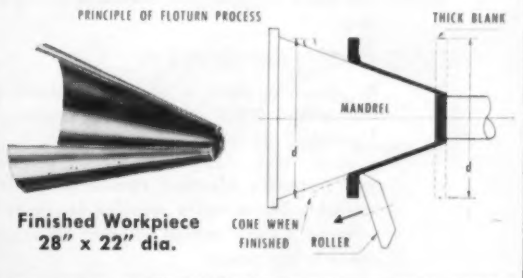
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ally rolls simple
nks into complex forms
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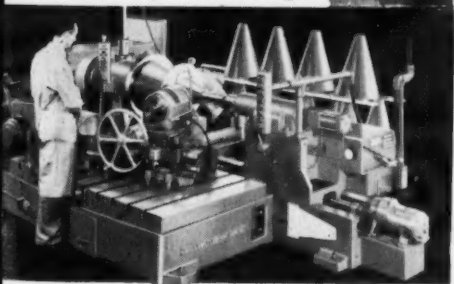
... the FLOTURN process starts with either a simple flat blank, machined blank, machined forging, drawn cup, wrapped and welded cylinder or centrifugal casting. FLOTURN equipment scientifically applies great pressure against the blank, causes the metal to flow in a cold state. Pressure is spirally applied continuously, flowing the metal to the shape of a mandrel.

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Floturn Lathe for cold forming.

FLOTURN

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for
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MACHINES**



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MOUNTED POINTS**



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for that last hundred-thousandth

**The
VK**

**LIGHT WAVE
MICROMETER**
0 to 3"



**Catalog
and
Handbook
No. 35**

The Van Keuren Light Wave Micrometer is an instrument of exceptional accuracy, ideal for measuring plug gages or small precision parts. Use it when you're after "that last hundred thousandth" involved in so many of today's measurements. The 0 to 3" instrument shown above has a 1/2" diameter, 40 threads per inch micrometer screw, which can be made with greater accuracy, and which has 3 times the wearing surface of an ordinary micrometer screw. It has an 8" diameter micrometer

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This 220-page volume represents years of research by the Van Keuren Co. It presents a simple and exact method of measuring screws and worms with wires, tells how to measure gears, splines and involute serrations. It is an accepted reference book for measuring problems and methods. As for your copy... sent free on request by wire. The Van Keuren Company, 175 Waltham St., Waltham, Mass.



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This Month's **GEAR PIX**



HIGH SPEED HOBBLERS—Michigan Tool's improved 1458-A Ultra-Speed gear hobblers are being used in ever increasing numbers in the gear industry. This battery of Ultra-Speed hobblers being assembled are the fastest single spindle hobblers made today.



COARSE HIGH DIAL—A typical $3\frac{1}{2}$ pitch 10-inch diameter gear with a $1\frac{1}{4}$ inch face width is cut on this heavy duty SHEAR-SPEED® gear shaper in less than $3\frac{1}{2}$ minutes. Over five pounds of chips are removed in the process.



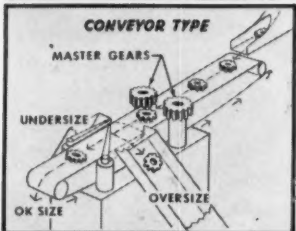
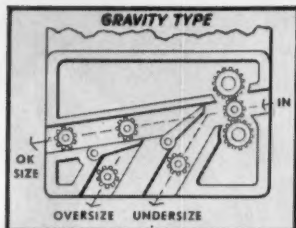
MICHIGAN TOOL COMPANY

7171 E. MICHIGANS RD. • DETROIT 12, MICH.

IN CANADA: COLONIAL TOOL CO. LTD.

over

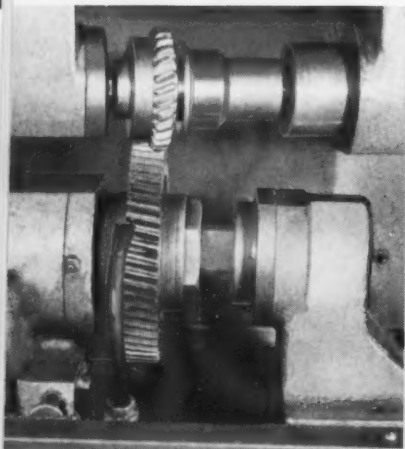
This Month's GEAR PIX



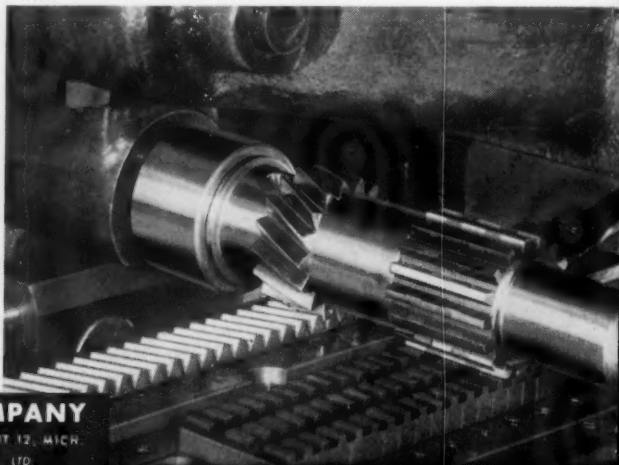
GRAVITY AND CONVEYOR TYPE—Gravity and conveyor-type systems, custom made for size-checking of gears, are available in the new automatic 3-WAY gear selectors. Automatic shut-offs can be incorporated into selectors located in a production line with full automation or one in which the operator feeds the gears manually. 3-WAY selectors can be used to inspect any spur or helical gear at a much more rapid rate than gear cutting or finishing machines can turn out gears.

ANNOUNCING—The SINE-LINE® model 1136 involute checker capable of handling large external and internal spur or helical gears up to 36-inch diameter, with a maximum spread between centers of 26 inches, has been added to the Michigan line of checking equipment. This checker may also be used to check tooth spacing. Checking principle is based on a single master disc, combined with a sine bar. No extra base forms or master base circle discs are required.

PLANNING—Alternately thick and thin steps on the tooth faces of this splined main drive shaft are shaved in a two minute cycle on a Michigan 900 rack type gear finisher. A master rack, offset relative to the shaving rack, guides the master helical gear mounted on the work arbor, in progressively removing 8 to 12 thousandths of metal to form steps in the face of the spline teeth.



MODIFIED UNDERPASS METHOD—Modified underpass methods shaves this tough steel sliding low and reverse gear in 30 seconds. A Michigan 870 Underpass gear finisher easily handles 120 of the 3.835" O.D. and 0.735" face width gears every hour.



MICHIGAN TOOL COMPANY

7171 E. MICHIGAN RD. • DETROIT 12, MICH.

IN CANADA: COLONIAL TOOL CO. LTD.

Over

*what's so
different about*

Piercing Color TV Chassis?

Color TV chassis are produced in small lots—require frequent engineering changes—setups and production tools are high cost operations.

THE WIEDEMANN RA-41P TURRET PUNCH PRESS economically produces chassis and panels in small lots for

**COLOR TV
RADAR
FIRE CONTROL
COMMUNICATIONS
BUSINESS MACHINES
AIRCRAFT**

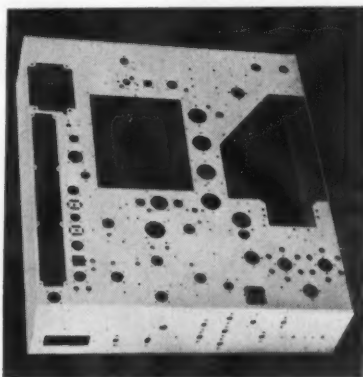
and many other applications

because:

- Setup time is low
- Initial tooling cost is low
- Punches and dies are re-used on other jobs so tooling cost soon becomes a negligible factor
- Engineering changes are accomplished without delay to production schedules and at low cost
- Complete flexibility—close hole centers—20 hole sizes in sheets to 28" x 40" in single handling—40 to 60 holes per minute located to plus or minus .003" tolerance

These advantages combine to make the RA-41P Wiedemann Turret punch press a paying investment to all chassis fabricators, since the RA-41P is the only machine designed for economically piercing electronic chassis and panels in low runs.

WRITE FOR A COPY OF BULLETIN 241



COLOR TV BASE
Quantity 55
(Pierced on Wiedemann RA-41P)
530 strokes of press
31 different punches and dies used
(no special tools)
2 handling operations
TOTAL TIME (floor to floor)
per piece 16.25 MINUTES

WIEDEMANN MACHINE COMPANY

4219 Wissahickon Avenue, Philadelphia 32, Pa.

5

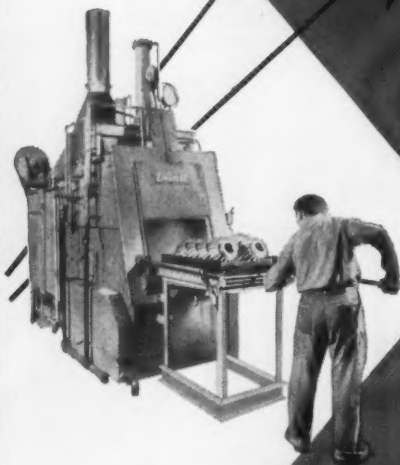
FURNACES IN ONE

the *LINDBERG* Carbonitriding Furnace

Yes, it's many furnaces in one! It's designed not only for carbonitriding . . . but also for hardening, carburizing and carbon restoration. It's self contained . . . it's easy to maintain!

10 reasons why Lindberg Carbonitriding Furnaces are better

1. Heating is by new type, gas-fired, vertical radiant tubes. They weigh only 29 pounds each . . . can be changed in two minutes.
2. Vertical radiant tubes last longer . . . often two or three times as long.
3. Quench tank is built-in . . . no costly excavation or piping necessary.
4. Quench tank has fin type oil cooler . . . maintains oil at proper temperature.
5. Specially designed chamber purges work before it enters heating chamber.
6. Special check-light system tells you where charge is at any given time.
7. Control of heating and quenching cycle is automatic.
8. Lindberg Carbonitriding Furnaces are made for automatic, semi-automatic, or manual charging.
9. Lindberg Carbonitriding Furnaces have been tested under three years of rough operating conditions.
10. Lindberg "Hyen" generators which supply atmosphere for Lindberg Carbonitriding Furnaces are instantly adjustable for many different types of atmospheres.



*For full details,
ask for bulletin #241*

LINDBERG  **FURNACES**

Lindberg Engineering Company • 2409 West Hubbard Street • Chicago 21, Illinois

How to Cut the Cost of Gaging Threads

with TAFT-PEIRCE JOB-RATED GAGES

The best gage for most jobs provides the best combination of speed, wear-resistance, upkeep, and initial cost. Here are some comparisons that will help you keep costs to a minimum.

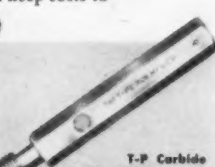
Thread Plugs



T-P Limit Thread Plug Gage. Standard hardened steel gages are lowest in initial cost and are preferable when soft or moderately hard materials are being inspected in limited quantities. Taper-Lock up to 1.510". Reversible Tri-Lock above 1.510".



T-P Electroplated Gages. With only a modest increase in initial cost, substantially longer wear life can be obtained with this exclusive surface treatment. Many users report up to 3 times longer gage life.



T-P Carbide Thread Plug Gage. For exceptional resistance to abrasion or scratching and maximum wear life. Furnished in both standard and special sizes — from 28 machine screw size up.

Rings & Snaps



T-P Thread Ring Gages. Lower in initial cost than other gages for external threads, they check a combination of all thread errors but cannot distinguish between them.



T-P Adjustable Thread Snaps. Faster than ring gaging, and just as accurate, they check lead, angle, and all other thread elements. Pitch diameter is variable.

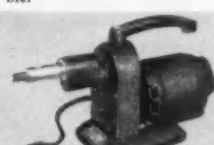


T-P Roll Thread Snaps. Same as adjustable, with rolls for gaging members. Since gaging members rotate, wear is spread over greater surface and service life increased.

Special Gages



T-P Rotochek (Flexible Shaft Model). Fastest thread gaging method yet devised. Push—and the gage screws into the work. Release the pressure and it stops. Pull—and it disengages. Can be used with most standard T-P plug or ring gages.

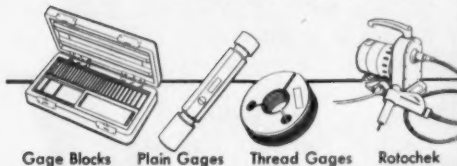


T-P Rotochek (Bench Model). Permits bringing work to gage, instead of gage to work. Like flexible shaft model, records indicate it triples rate of parts inspection.



T-P Thread Concentricity Gage. Typical of the infinite variety of special gages made to order by T-P every year. This one checks size and location of internal threads.

For the complete story on these items and many more, send for your copy of the Taft-Peirce Handbook.



Gage Blocks

Plain Gages

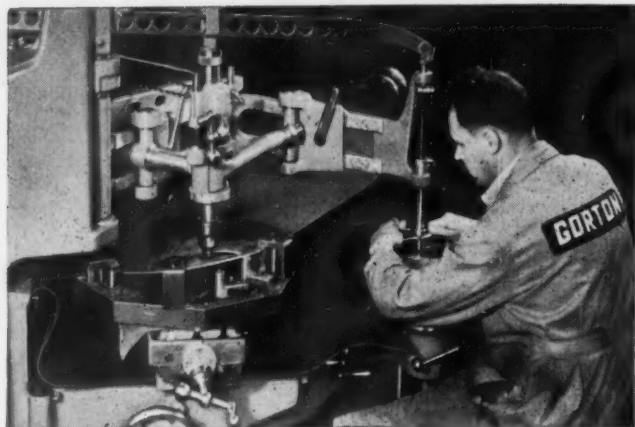
Thread Gages

Rotochek

*T-P means
Top Precision*



THE TAFT-PEIRCE MANUFACTURING COMPANY, WOONSOCKET, R. I.



Tracer-Controlled Pantograph cuts and rounds thermal slot in 8-foot steel propeller blade in 40 minutes; previous time was 5 hours, 10 minutes — just one of hundreds of examples of time and cost saving with tracer-controlled Pantograph machines.

Pantography IS NEW —

By George Gorton III
Executive Vice President
George Gorton Machine Co

— in the sense that industry at large and Metal Working people in particular are just beginning to appreciate the many advantages Pantography offers to those faced with the Design-Production problems of today and tomorrow.

INDUSTRY'S foremost responsibility right now is to produce faster, to highest quality standards and at lower cost — whether on defense contracts or for our civilian needs.

Today, there are literally thousands of operations being performed throughout industry which can be speeded up, improved in quality and lowered in cost by the use of available models of special machine tools. The modern tracer-controlled Pantograph machine is such a tool. It is both a special purpose machine, ideal for short runs, and it is an accurate single purpose machine which turns out identical parts or pieces to meet tight production schedules.

The tracer-controlled Pantograph machine is used for inside and outside profiling, routing, die sinking, mold cutting, counterboring, contour milling, chamfering, grooving, graduating and engraving in ferrous and non-ferrous metals, as well as in plastics.

This machine performs on flat, uniformly curved, cylindrical, spherical or

irregular shapes — it works in either 2 or 3 dimensions, in all directions on a horizontal plane, and vertically. It employs enlarged masters, templates or patterns which are quickly and easily made and operates normally at a reduction ratio thereby increasing accuracy — exclusively characteristic of the pantograph.

Single or repetitive accuracy — from one piece to thousands — manual or full automatic operation depending upon quantities — work sizes from the size of a dime to as large as 10 feet.

A new booklet, "Pantography," explains the process and shows what this type of machine can do for you. It is yours without obligation. Write for it today. If interested, also ask for our latest General Catalog 1655. Address the George Gorton Machine Co., 1708 Racine St., Racine, Wisconsin, U. S. A.



OUR NEW OFFICES



589 FIFTH AVENUE



Years of Progress

Since 1841, the Dessau firm has contributed greatly to the steady growth of American Industry. Your continued good will and the confidence you have placed in DESSAU these many, many years, have helped to make it possible for us to produce Industrial Diamond Products of the highest standards, accepted throughout the world! To service you with even greater efficiency we are moving to larger quarters . . . in the newest and most modern office building in New York City . . . 589 Fifth Avenue.



- INDUSTRIAL DIAMONDS
- DIAMOND TOOLS
- DIAMOND WHEELS

MAURICE S. DESSAU CO., INC.
589 FIFTH AVE. • NEW YORK CITY



DAVID S. DESSAU





SIMON DESSAU



MAURICE S. DESSAU



STEPHEN M. DESSAU

The weight of  eight elephants
...but the precision of a  fine watch!

AN
OVERSIZE
GRANITE
SURFACE
PLATE

by Herman Stone



The Granite Surface plate shown here weighs 25 tons—yet it has been ground and polished to perfection by Herman Stone craftsmen to .005 mean overall tolerance! . . . And this precision is permanent! Granite will not warp, dent or bulge. It is not affected by strain or temperature changes. It remains perfectly level—permanently!

What's more, Granite is *harder* than nearly every type of tool steel! It wears years

longer than metal and is maintained at a fraction of the cost. Whereas some types of plates require resurfacing every 6 months, many Herman Stone Plates have been in constant use for more than 12 years without a single resurfacing!

Herman Stone Granite Surface Plates Pay For Themselves—by saving maintenance, resurfacing, checking and production time!

Get full details on Herman Stone Pink or Grey Granite Plates—"regular or elephant-size." Free estimates of your requirements—no obligation. Write today!

The Herman Stone Co.

324 Harries Building, Dayton 2, Ohio

First in the Field—Still First in Quality

this
RODGERS PLATEN PRESS
 produces
GRIDDLES
 at a sizzling rate!



Ever since they changed from a mechanical press to a Rodgers 100 ton Hydraulic Platen Press, Northland Aluminum Products of Minneapolis has reported they are not only pleased, but also surprised at the unusual results. No wonder! . . . production is up . . . product quality and finish is better . . . die wear is reduced . . . and die setup time is less. All these advantages are vitally important to Northland for they make a variety of products like Nordic Ware Aluminum Utensils, Griddle King Griddles and Steak Platters.

Although you may produce an entirely different line of products you probably would find a Standard Rodgers Platen Press would offer you the same advantages . . . whether your jobs are stamping, forming, drawing, coining, or die try-out . . . in metal or plastics.



*Write for the new Illustrated
 Rodgers Blue Ribbon Catalog*

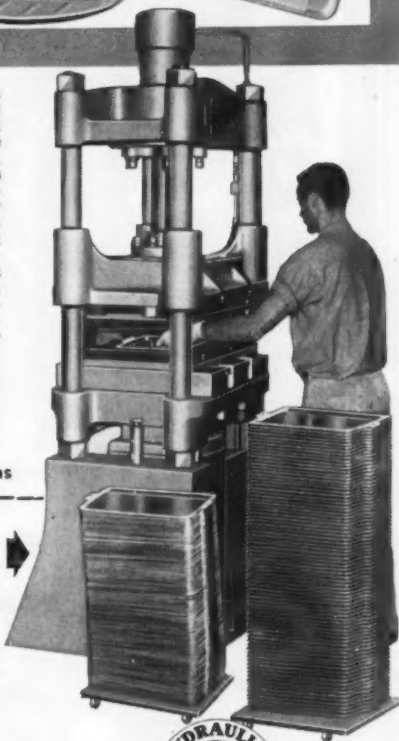
it gives complete details and specifications

**RODGERS BLUE RIBBON
 PLATEN PRESSES FOR:**

- Metal Drawing and Forming
- Plastic and Rubber Molding
- Die Try-Out General Assembly and Utility Work
- Capacities from 10 to 500 tons pressure



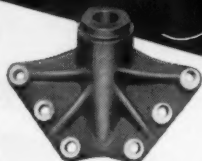
Here is the Rodgers 100 ton Hydraulic 24"x24" Platen Press which blanks and forms Northland Griddle Kings at the rate of 8 per minute. Aluminum is .153—finished size is 10 $\frac{3}{4}$ " x 17 $\frac{1}{2}$ ".



Rodgers Hydraulic Inc.

7447 Walker St., Minneapolis 16, Minn.

a tough job...
an easy solution



... another MORRIS MOR-SPEED
production machine

OPERATIONAL CYCLE:

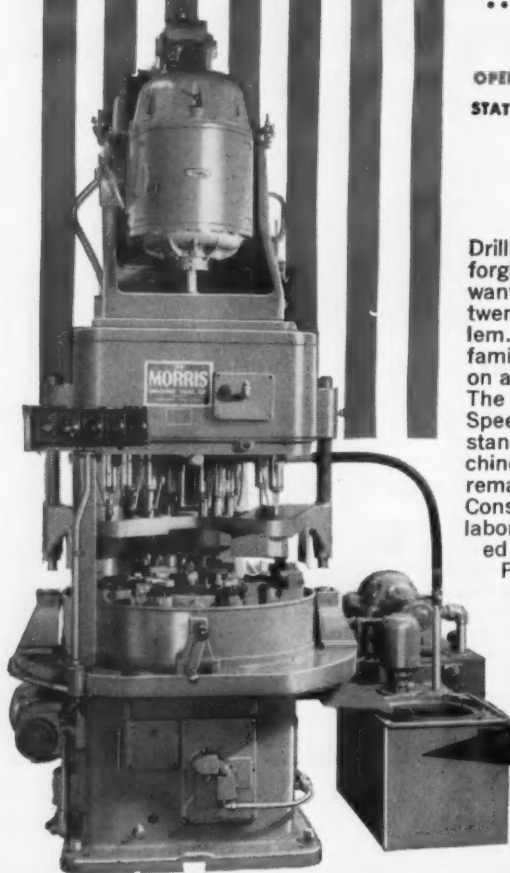
- STATION #1—Load and unload**
#2—Drill two 57/64" holes
Drill four 29/32" holes
#3—Spot face six holes
#4—Ream (.9062") two holes

Drilling six large holes in armor plate forgings is no cinch, but when you want a finished part every minute and twenty seconds, that's a tough problem. To Morris Engineers, it was a familiar problem . . . precision drilling on a mass production basis!

The machine furnished was a Mor-Speed Four Station Vertical, using standard units to give "special machine" production and precision at remarkably low cost.

Consider the savings . . . investment, labor, time and floor space . . . offered by Morris Mor-Speed Machines.

Precision high production can be yours for less than you might imagine!



Morris

THE MORRIS MACHINE TOOL CO.

934 Harriet St., Cincinnati 3, Ohio

TURN PIPE DREAMS INTO PIPE BENDS

Prices
start
as low as
\$1575.00

(Motor and all
Electrical
Equipment
included)

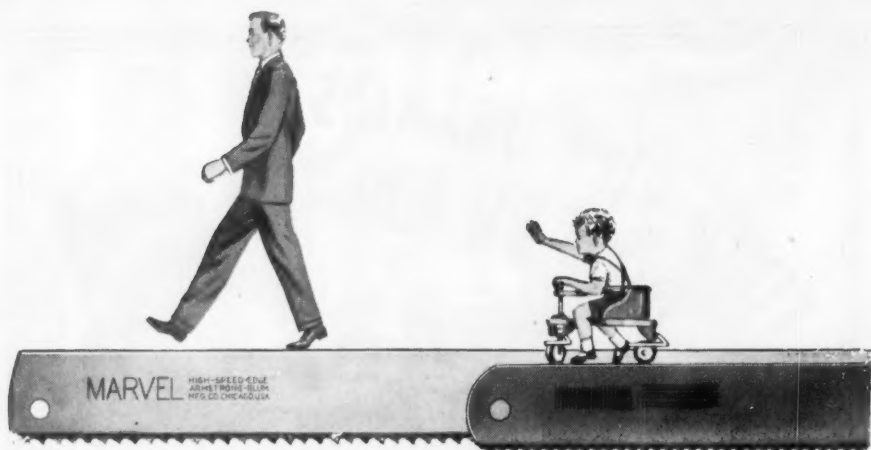


Pipe, tube and structural bending is now simplified with a PEDRICK PRODUCTION BENDER. Heretofore difficult bends, such as offsets and off-plane bends, can now be made in production quantities at an amazingly low cost. ALL PEDRICK PRODUCTION BENDERS are complete with motor, and are equipped with automatic duplicate bending relays.

Write for Descriptive Folder. Dept. 5.

PEDRICK TOOL & MACHINE CO.

3640 N. LAWRENCE ST., PHILADELPHIA 40, PA., U.S.A.



...but

Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate—without the "know-how" of MARVEL EXPERIENCE . . .

Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be **SAFE**, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!



ARMSTRONG-BLUM MFG. CO. • 5700 Bloomingdale Ave. • Chicago 39, U. S. A.

PROBLEM...

Produce female tapered Modified-Buttress thread in SAE4340 steel ferrule, Rockwell C28-32. Major thread diameter $3\frac{3}{4}$ ". Thread length $2\frac{1}{2}$ ".
TOLERANCES—Accumulated lead error not to exceed 0.001 over full length. Accuracy of 10° taper, ± 30 seconds. Thread finish—32 micro inches.

Thread-milling machine set up with special multiple thread cutter. Ferrule blank and gauge in foreground.

...solved by HANSON-WHITNEY Thread Milling

McCauley Industrial Corporation, Dayton, Ohio, manufacturers of aircraft propellers, demand exacting workmanship. Specifications on this blade retention ferrule are unusually rigid for *thread accuracy* and *finish*.

The combination of the Hanson-Whitney Thread Milling Machine and the highly accurate special cutter produced by Hanson-Whitney

gave this manufacturer the high quality needed . . . on a production basis . . . and with *no* scrap loss.

If your threading problems involve *accuracy*—to meet any specification, *production*—to meet any schedule, *uniformity*—to meet any inspection, call your Hanson-Whitney representative for his recommendations.

H **the HANSON** Threading Processes offer complete Coordinated Responsibility for The Machine Tools, The Cutting Tools and The Measuring Gauges.

HANSON-WHITNEY COMPANY
Division of Whitney Chain Company
Hartford 2, Connecticut, U.S.A.



REDUCE YOUR COST OF RADIAL HOLE DRILLING!

A Standard Machine Designed for Variety Production

Why build a special machine for drilling radial holes when a standard machine equipped with Govro-Nelson Automatic Drilling Units will, in many cases, perform the work of a special machine that would cost considerably more!

Any number of drilling units up to eight may be employed, the units being movable not only through 360 degrees on the circular table but also movable endwise on riser plates to meet the requirements of the part being drilled.

The machine may also be used for tapping operations with Govro-Nelson Tapping Units. It has a range of $1/32''$ to $3/8''$ on drilling operations and 0-80 to $3/8-16$ on tapping operations, depending on material and spindle speeds. A single, momentary contact start-button causes all units to operate simultaneously.

If you are interested in reducing the cost of your radial drilling and tapping operations, write for price and dimensional data.

WRITE FOR
Literature

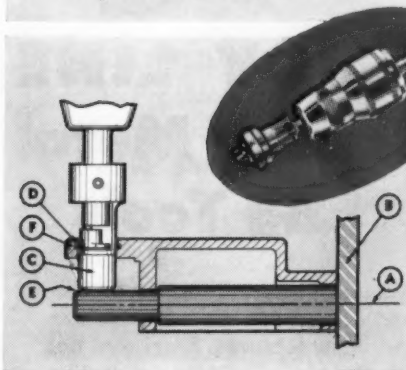
GOVRO-NELSON CO.

Machinists of Precision Parts for 30 Years

1933 Antoinette
Detroit 8, Mich.

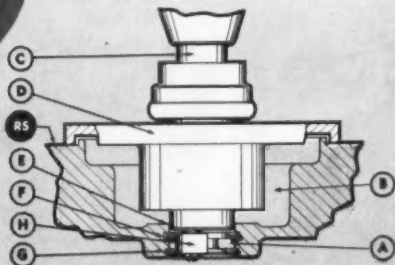
Automatic **DRILLING UNIT**

Waldes Truarc grooving tool solves tough internal grooving problems, cuts costs in assembly-line production



Problem: Locating a Groove from Centerline of a Hole A.

Workpiece is fitted into plug on fixture plate B. Bottom adaptor C on standard Waldes Truarc Grooving Tool is piloted into bore D and registers on side of plug E. Groove F is cut in exact location required.



Problem: Cutting Two Grooves - One Rectangular, One Beveled - Located in Bore A in Large Cavity B of Workpiece, and Located From Reference Surface RS.

Waldes Truarc Grooving Tool is fitted with elongated spindle assembly C and special bushing D which spans large cavity permitting tool to register on reference surface RS. Bushing also pilots tool into counter-bore at E. Both grooves F and G are cut simultaneously with special form cutter H having both required contours.

AMAZINGLY VERSATILE! The Waldes Truarc Grooving Tool adapts quickly and simply to your toughest recessing requirements. With it, even *unskilled labor* can perform and maintain high precision, mass production operations.

WIDE CUTTING RANGE! The Waldes Truarc Grooving Tool comes in five models: A-1, A-2, A-3, B and C. This wide variety of models enables you to cut accurate grooves in

housings with diameters from .250 to 5.000 inches. Special features, modifications and adaptations allow each model to operate efficiently under many varying conditions.

SEND YOUR PROBLEMS TO WALDES! Whatever your internal grooving problem, send us your blueprints and let Waldes Truarc engineers give you a complete analysis, price quotation and delivery information on the most economical tool set-up for your particular job.



WRITE NOW FOR 20-PAGE MANUAL
CONTAINING FULL INFORMATION ON
WALDES TRUARC GROOVING TOOL

**WALDES
TRUARC**
REG. U. S. PAT. OFF.
GROOVING TOOL

MADE BY THE MANUFACTURERS OF
WALDES TRUARC RETAINING RINGS.
WALDES KOHINOOR, INC.,
47-16 Austel Place, L. I. C. 1, N. Y.
WALDES TRUARC GROOVING TOOL MANUFACTURED UNDER
U. S. PAT. 2,411,429



Waldes Kohinoor, Inc.
47-16 Austel Place, L. I. C. 1, N. Y.

MM086

Please send me your new 20-page technical
manual on the Waldes Truarc Grooving Tool.

Name

Title

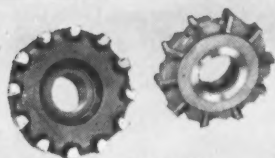
Company

Business Address

City Zone State



The Complete LOVEJOY LINE of Modern Metal Cutting Tools



MILLING
CUTTERS



BORING BARS
AND HEADS



ARBORS



COUNTERBORES

FLYWHEELS



SPECIAL
CUTTERS

END
MILLS
AND HOLDERS



BLADES



The Lovejoy line of inserted-tooth type cutting tools has never been more complete — or offered so many features. Every tool has been designed to give maximum production with a minimum of down time for sharpening. Lovejoy tools feature the exclusive "Positive-Locking" device that assures rigidity even during heavy intermittent cuts — making them rugged as solid tools. Their housings — of husky forged steel — are designed for longest life.

Lovejoy H. S. S., Carbide and Cast Alloy Blades are interchangeable in the same housing and are stocked for immediate shipment.

For standard or special cutters, call on Lovejoy — suppliers to the world's leading manufacturers for over 35 years. Write today for Catalog No. 28 which describes the full line of Lovejoy tools.

"Speed & Feed Calculator"
free on request



130 MAIN ST., SPRINGFIELD, VERMONT

LOVEJOY TOOL COMPANY, INC.

800 Tons of Plate Formed Monthly

STEELWELD PRESS
Produces
Infinite Variety of
Curves and Bends

This Steelweld Press is rated at $\frac{1}{2}$ "x14'-0" mild steel. With the 24-inch bed and ram extension at each end, it will bend plate that can clear by the 18-inch deep throat to 18'-6" long. Two cross shafts with foot pedals are provided for operating the press. The lower shaft is for normal operation while the upper shaft brings the reversing flywheel into action to back the ram off the work whenever desired.



EVERY month some 800 tons of plate of all thicknesses to one-half inch is formed with bends and curves of every description on a Steelweld Press. The machine is in operation nine hours a day.

Since parts formed are produced in very small duplicate quantities, the dies and machine settings usually must be changed many times during a day.

Because of the ease with which Steelweld Presses can be set up, the operators can do this quickly and easily.

Steelweld Presses offer so many advantages that we urge you to write for the catalog below and get all the facts on them. Hundreds of these machines are now in use for bending, forming and punching operations of every description.

GET THIS BOOK!

CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.



THE CLEVELAND CRANE & ENGINEERING CO.

6451 East 281st St.

Wickliffe, Ohio

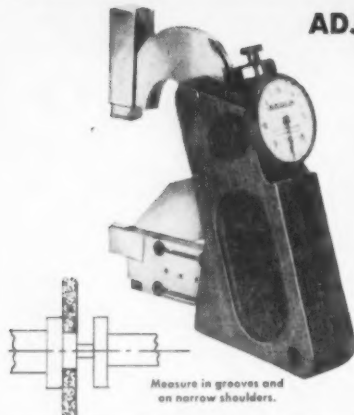
STEELWELD

BENDING PRESSES

BRAXING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING

Two **NEW** gages get measurements *IN THE GROOVE!*

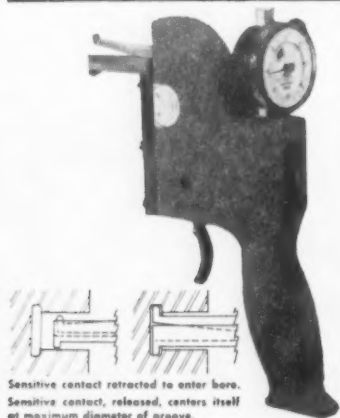
ADJUSTABLE INDICATING SNAP GAGES 1340 TYPE



Measure in grooves and on narrow shoulders.

THESE ADJUSTABLE SNAP GAGES show *actual* dimensional variations of .0001" because the gage rests on the "solid" upper anvil and the reading is not influenced by the weight of gage nor by the user's hand. The anvils are offset at front of gage and the upper anvil is readily adjustable. When it's locked at the desired position, minor adjustments are made by adjusting the Indicator Dial. The thin anvils and arms of these gages are particularly useful for measuring in grooves, slots, or between close shoulders. Inexpensive, adaptable and totally dependable, these new gages have a thousand uses in all shops — whether small or large.

ADJUSTABLE I. D. GROOVE GAGE



Sensitive contact retracted to enter bore.
Sensitive contact, released, centers itself at maximum diameter of groove.

THIS NEW GAGE IS ADJUSTABLE TO MEASURE the diameter of a wide range of internal grooves as used for sealing or retaining rings. Adjustable to measure grooves between .725" and 2.625" diameter, it enters bores with diameters down to .500". Contacts at the ends of the arms check grooves even at the bottom of blind holes. Because the fixed contact is on lower arm, neither the weight of the gage nor pressure from the operator's hand affects the reading.

For the whole story on these NEW gages, write Federal Products Corporation, 4148 Eddy St., Providence 1, R. I.

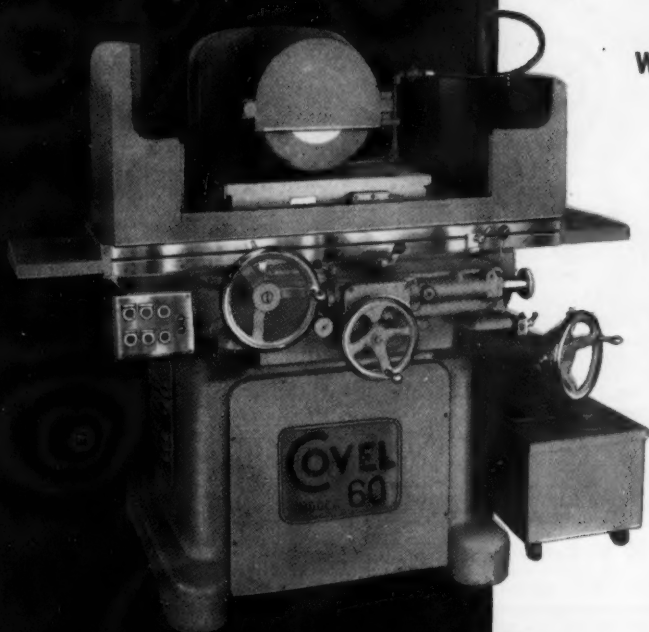
Ask **FEDERAL**

FOR ANYTHING IN MODERN GAGES...

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automatically Controlling Dimensions on Machines

COVEL No. 60 SURFACE GRINDER... ENTIRELY *NEW*

WITH 15" CROSS FEED



Covel presents the No. 60 — latest in its 80-year line of precision machines . . . This ultra-modern surface grinder features a 14" x 24" work surface . . . 15" width of cross feed . . . 27" table travel . . . vertical work capacity of more than 18" . . . automatic, closed circuit hydraulic system . . . powered elevation and a long list of advantages best described in a new bulletin . . . yours for the asking.

Here's a Typical Use:

This new "60" is set up for wet grinding the surface of a trim die for die castings — but one of the wide range of tool room and production jobs for which this latest Covel grinder is suited.



WRITE
FOR
New
Bulletin
No.
M-84

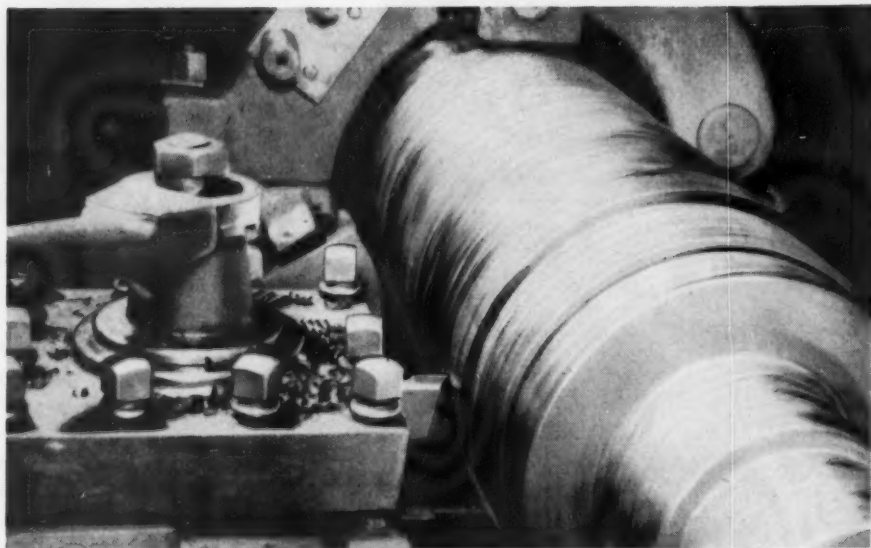
80 YEARS of
continuous manu-
facturing experience
makes your COVEL
choice a sound one.

COVEL

PRECISION GRINDERS
BENTON HARBOR, MICHIGAN

DRILL GRINDERS • UNIVERSAL CUTTER & TOOL GRINDERS • HYDRAULIC & HAND FEED SURFACE GRINDERS

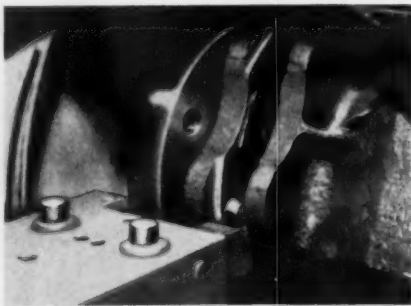
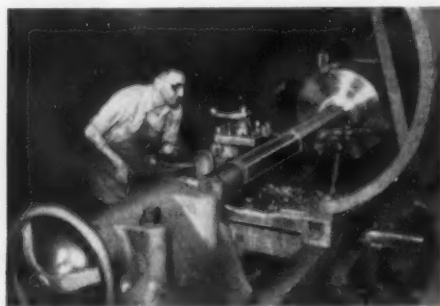
CARBOLOY ANNOUNCES NEW GRADE 350 CARBIDE



CARBOLOY GRADE 350 for light roughing, general finishing of steel

ELECTRIC MOTOR SHAFT. Carboloy Grade 350 increased the number of linear inches cut by 30% over other carbides used for roughing and finishing this steel motor shaft.

SETUP: Material—AISI 1045 modified (hot-rolled).
Speed—300 SFPM. **Feed**—0.020 inch. **Depth of cut**— $\frac{1}{8}$ to $\frac{1}{4}$ inch. **Coolant**—Yes.



CARBOLOY GRADE 370 for heavy-duty steel cutting at higher speeds

JET ENGINE TURBINE WHEEL SHAFT. A single Grade 370 tool now handles roughing and finishing at General Electric's Lynn River Works. Formerly, two tools were needed. Though operating at around 1700° F., Grade 379 increased tool life at least 40%.

SETUP: Material—4340 steel with Brinell hardness from 269 to 321. **Speed**—200 SFPM. **Feed**—0.018 inch. **Depth of cut**— $\frac{3}{8}$ to $\frac{1}{2}$ inch. **Coolant**—No.

TRANSMISSION CASING for fork lift truck. Machine downtime was sliced 50% and tool life extended almost 40% when Yale and Towne switched to Grade 370. Despite irregular steel casting, tool life on plunge facing operating increased 5 times with Grade 370.

SETUP: Material—Irregular cast steel with chilled spots and sand occlusions. **Speed**—318 SFPM. **Feed**—0.006 inch. **Depth of cut**— $\frac{3}{8}$ to $\frac{1}{2}$ inch. **Coolant**—No.

FOR LIGHT ROUGHING, GENERAL FINISHING OF STEEL

On-the-job tests show that Grade 350 cuts faster, lasts longer than existing carbides; boosts production up to 30%

Carboly® Grade 350—the second of the new Series 300 steel-cutting carbides—combines superior wear resistance and extreme toughness to an extent never before possible in the light roughing and general finishing range of steel machining. This has been proved during exhaustive on-the-job customer tests and applications. Grade 350 is outperforming all existing carbides by up to 30% in this medium-duty range.

Built-in Tip Rigidity

A new, carefully controlled manufacturing process gives Grade 350 a unique grain structure and built-in structural rigidity. This rigidity enables Grade 350 to effectively

resist the high temperatures (around 1800°) encountered during high-speed machining . . . conditions which cause the cutting edges of other carbides to deform.

Two Steel-Cutting Grades Now Available

Grade 370 for heavy-duty steel cutting, introduced late in 1953, was the first of the new Carboly Series 300 carbides. Now Grade 350 extends the machining range of this new series to medium-duty steel cutting. Both grades are available immediately in a wide range of Standard Carboly Tools and blanks. Send coupon, today, for new Price List (GT-300) containing complete specifications and ordering information.

GRADES 350 AND 370 STOCKED IN WIDE RANGE OF STANDARD TOOLS AND BLANKS

For light roughing and general finishing of steel

GRADE 350 { **STOCK ITEMS**
Blanks—6 styles, 40 sizes
Tools—5 styles, 20 sizes

For heavy-duty steel cutting

GRADE 370 { **STOCK ITEMS**
Blanks—6 styles, 55 sizes
Tools—9 styles, 26 sizes

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

"Carboly" is the trademark for products of the Carboly Department of General Electric Company

CARBOLOY

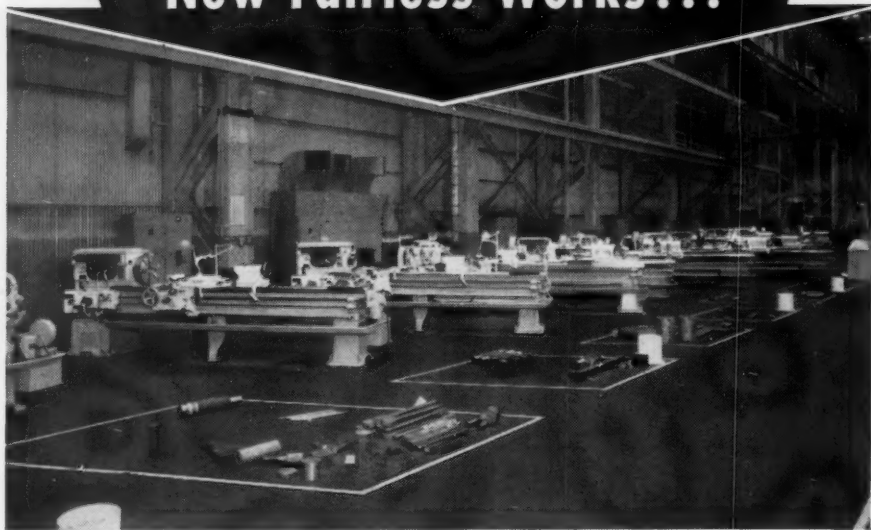
Department of General Electric Company
11143 E. 8 Mile Street, Detroit 32, Michigan

- ☐ Send Price List GT-300, containing specifications and prices on new Grades 350 and 370
☐ Have a Carboly Field Engineer call

Name _____ Position _____
Company _____
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City _____ Zone _____ State _____



13 LEHMANN Engine Lathes NOW at work in U. S. Steel's New Fairless Works...



The largest integrated steel mill to be built at one time uses LEHMANN Lathes in its modern maintenance shops!

The Fairless Works, built on 3,900 acres and one of the biggest expansion projects built in our time, incorporates the most modern steel mill equipment available. One of the big jobs at Fairless is that of maintenance. Special shops to keep all the equipment used in this 2.2 million ton plant in top running order are an important part of Fairless.

The machine tools, cranes and other equipment necessary for cleaning, machining and repairing the mill operating equipment (which, in fact, make practically all repairs required at Fairless) include 13 Lehmann engine lathes! Some of these lathes are shown in the above photo.

Find out how Lehmann Lathes can bring efficiency, safety and speed to the operations in your plant. Write today for information or catalog — or — send prints for time and money saving recommendation.

LEHMANN

MACHINE COMPANY

GRAND at CHOUTEAU • ST. LOUIS 3, MO.

DIVISION OF MOVO ENGINE CO.



Form or Dress
Your Tool Wheels
—in a jiffy—

with a **NORBIDE[®]** Dressing Stick

JUST a couple of passes with a handy NORBIDE Dressing Stick is all it takes to clean up a wheel face, dress a radius or groove or touch up a cup or saucer wheel. And with this conveniently sized stick you can see more of the wheel and thus avoid costly overdressing.

A NORBIDE Stick of boron carbide—the hardest material made by man—will outlast hundreds of ordinary abrasive sticks. You'll find it will greatly reduce dressing dust nuisance also.

Order a supply of these cost-cutting sticks from your local Norton distributor or write for Form 1567 giving more details.

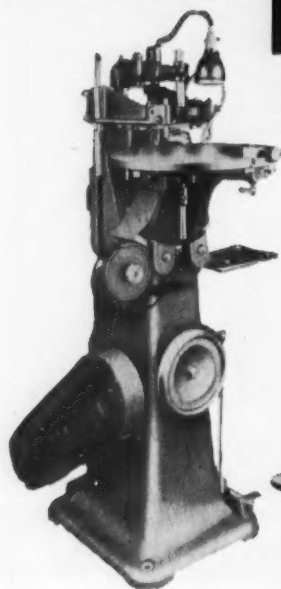
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*Next to the diamond in hardness—
available at a fraction of diamond cost*

Get **Unsurpassed**
Accuracy, Speed and Efficiency
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... And Save Up To 60%



For 4 decades, Oliver of Adrian has been designing, engineering and producing Die Makers . . . reliably serving thousands of plants all over the world. Many of these machines have been in continuous use for more than 25 years—making dies by machine sawing and filing—the proved Oliver Way.

With long lasting OLIVER DIE MAKERS, no expensive, hard-to-get skilled labor is required for sawing, filing and lapping operations. Yet you get *unsurpassed Accuracy, Speed and Efficiency*—meaning tremendous savings in time and costs—as much as 60%.



BE WISE, OLIVERize—for Die Making that will best meet your requirements.

OLIVER DIE MAKERS Available in 5 Models

The Bench Model S-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

The Heavy Duty Model (illustrated) has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

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AUTOMATIC DRILL GRINDERS
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• Our experienced technical staff will help you determine what grade of cold finished bar would best help cut costs in *your* shop. Often, you can realize great savings by not over-buying quality . . . the best bar for the job is *not* necessarily the most expensive.

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At the right price

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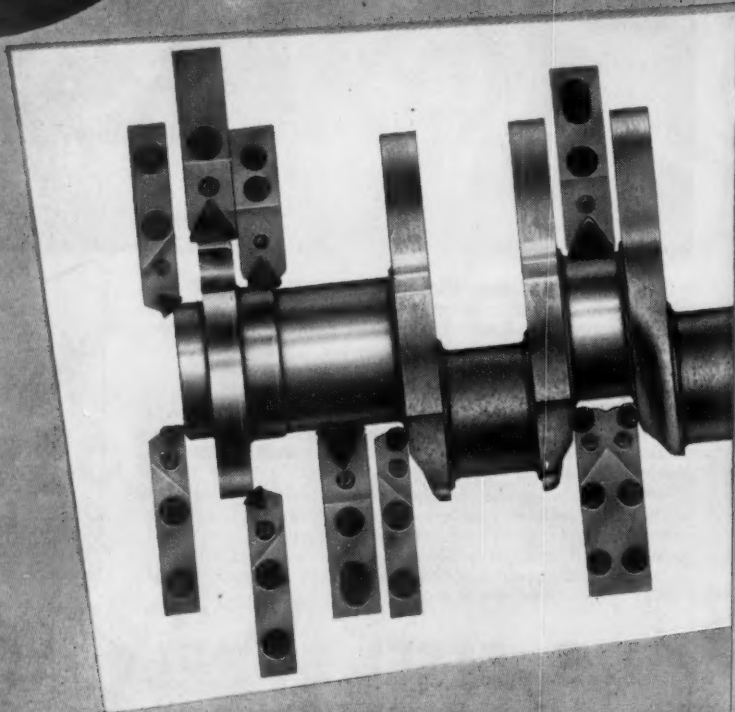
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HOLDERS**

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Wessonmetal—the
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formance throughout
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successes on this difficult
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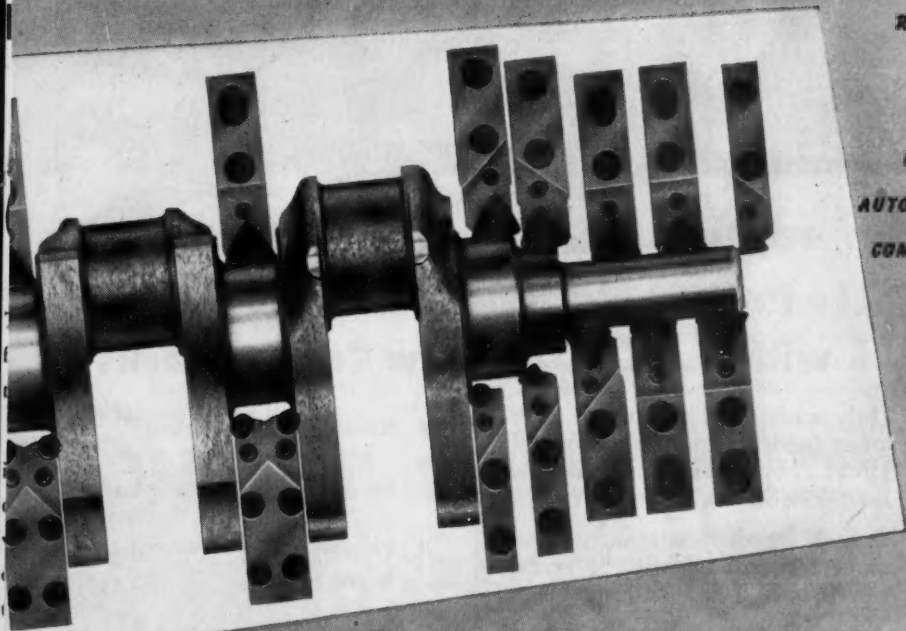
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USING WESSON BAND TYPE TOOL HOLDERS

and WESSONMETAL SOLID CARBIDE INSERTS

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AT ONE
OF THE
LARGEST
AUTOMOTIVE
COMPANIES**



HERE'S OUTSTANDING PERFORMANCE!

AN AVERAGE OF 9000 PIECES PER INSERT BEFORE SHARPENING

OLD METHOD

Pieces	11 per hour
Cycle time	1 min. 55 seconds
Crank per	
tool change (average)	1.7 pieces

NEW WESSON METHOD

Pieces	48 pieces per hour
Cycle time	40 seconds
Crank per	
tool change (average)	1500 pieces

WESSON COMPANY

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Now—Lock Your Feed Rates to Protect Machines . . . Reduce Costs with the **CROSS** Flow Control Lock!

Only authorized personnel carry a key for the Cross Flow Control Lock! They set machine feed rate, then lock it.

Easy to install. Just remove valve nameplate and adjusting lever, re-install over lock mounting plate.

Available for Vickers 1/4" flow control valves and remote control panels.

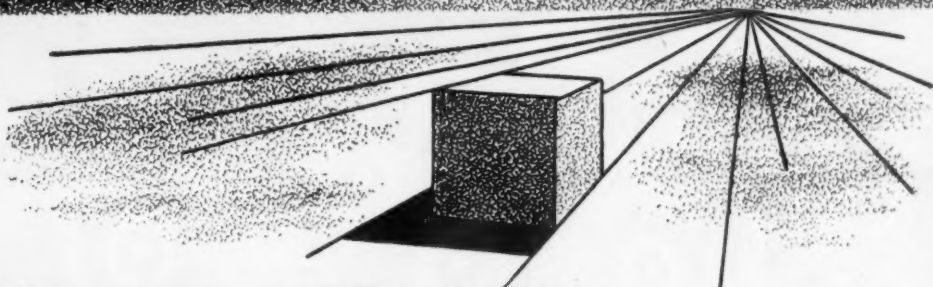
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- Eliminates Tampering
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Established 1898

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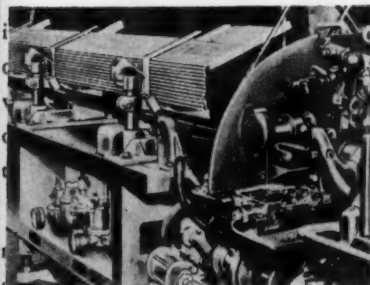
Through the 4th Dimension Time Barrier to New Production Highs



LIPE AML BAR FEED

gears machine production to the steady flow of Time

All industrial results are achieved in Time . . . vital 4th dimension that measures output, costs, profit. Shorten the time gap between operations . . . shorten the time when machines are "cutting air" . . . keep machines producing at a steady optimum rate during the fatigue slow-down from 10:30 to noon, and from 3 P.M., till closing time . . . and you are getting 4th Dimension production. Production that is geared to the steady flow of Time.



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Time losses account for the enormous differences in output among workmen. By eliminating these losses automatically, the Lipe AML Bar Feed boosts overall production from 30% to 100%. That's because stock is fed to the machine independent of the operator. Constant pressure behind the stock assures uniform speed of feed. No feed fingers to fail or mar stock. No multiple feed-outs, even on the longest pieces.

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full details on the Lipe
AML Bar Feed.**



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Syracuse 4, N. Y.

Sure, I'd like to know more about the Lipe AML Bar Feed. Send me your free booklet.

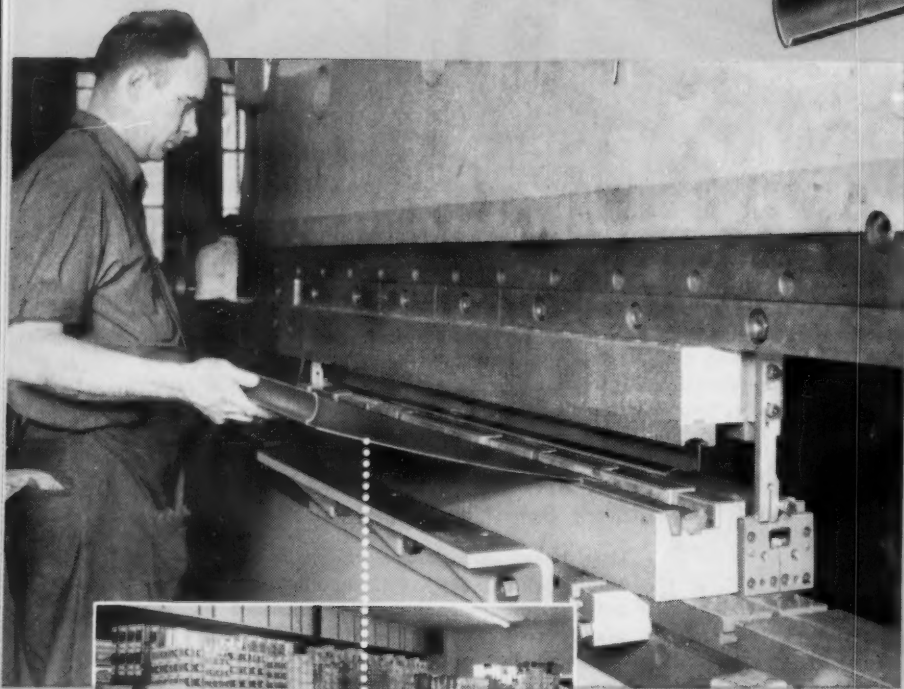
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Only accurate forming



*Photos courtesy of E. O. Bulman Mfg. Co., Inc.,
Grand Rapids 2, Michigan.*

Note the clean straight lines of the moldings formed on the Cincinnati Press Brake.

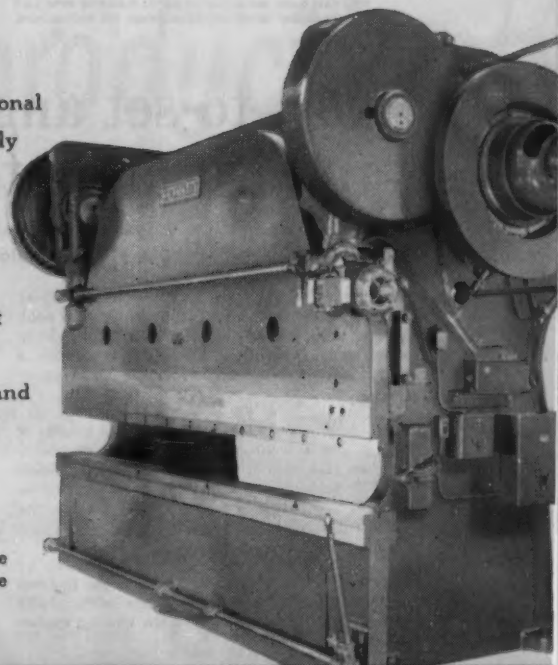


...could solve this problem

The long steel shelves of these sectional display racks are formed so accurately that sections match perfectly with lines straight and clean.

The Cincinnati Press Brake is forming to such close tolerances that a masking strip previously used is eliminated. A production increase and no discards has materially reduced costs while product was improved.

Write for the New 72-Page
Cincinnati Press Brake
Catalog.

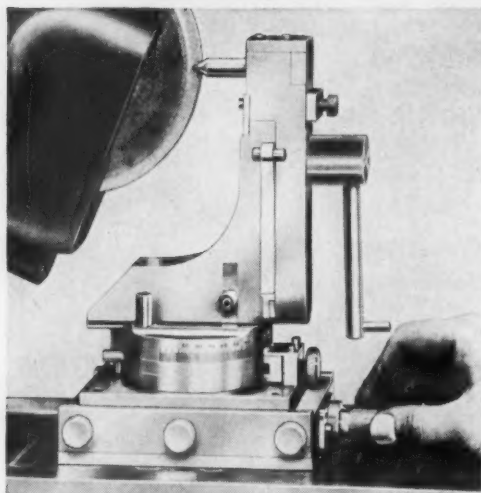


THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES





YOU CAN DRESS WHEELS UP TO 24" IN DIAMETER WITH J & S "FLUIDMOTION" WHEEL DRESSERS. MODEL REC SHOWN HERE.

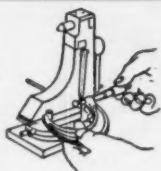
Measure over diamond point to back of micrometer plate.

1



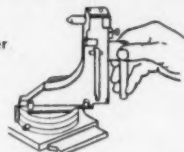
Add required convex radius or Subtract required concave radius.

2



Tighten gib. Dresser ready for action.

3



How to set angles in seconds, radii in minutes—save hours

These easy instructions show you how you can with a J & S "Fluidmotion" Wheel Dresser

Dressing wheels with a J & S "Fluidmotion" Wheel Dresser is easier than you might think. All you need is a micrometer and simple hex wrench. With a little practice, you can set 2 angles in about 10 seconds, a radius in just 2-3 minutes. Here's how to go about it:

To Obtain One Angle

Adjust center line of grinding wheel to height of diamond. The swivel base of the dresser is graduated at 100° on each side of center. Loosen knurled knob and hold both pins which protrude from bottom rings. Then simply set desired angle, tighten the knurled knob, and you're ready for action.

To Obtain Two Angles

Loosen knurled knob and set the pin on the *bottom ring* first for one angle. Then move pin on the middle ring for the other angle. Tighten the knurled knob—that's all there is to it.

To Obtain a Convex Radius on Grinding Wheel

Measure master reading over diamond point to back of micrometer plate (drawing #1) . . . for example . . . 2.531"
Add required convex radius (drawing #2) . . . + .069"
Setting for micrometer pins 2.600"

To Obtain a Concave Radius on Grinding Wheel

Measure over diamond point to back of micrometer plate (drawing #1) . . . for example 2.900"
Subtract required concave radius (drawing #2) . . . - 2.142"
Setting for micrometer pins758"

Tighten gib. Dresser now ready for action (drawing #3)

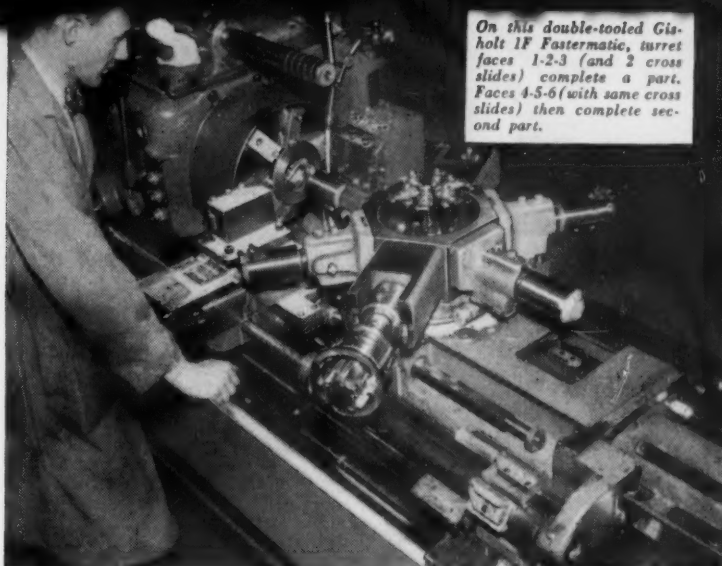
How much time and trouble can a J & S Wheel Dresser save you? Figure it up. Then write us for complete information.



WHEEL DRESSERS • JAW CLAMPS • PRECISION VISES • SINE BARS • DOWN-HOLDING DEVICES

645 W. MT. PLEASANT AVE., LIVINGSTON, NEW JERSEY

**HOW
DUPLICATE
TOOLING...
AND A
FASTERMATIC...**



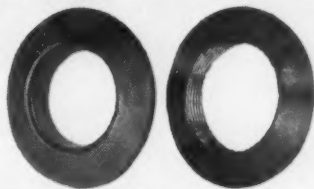
On this double-tooled Gisholt 1F Fastermatic, turret faces 1-2-3 (and 2 cross slides) complete a part. Faces 4-5-6 (with same cross slides) then complete second part.

doubled production!

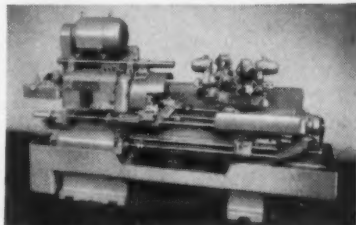
The time and unit cost for machining these cast iron pulley flanges were cut in half when the Fastermatic with double tooling took over the job.

Just three turret faces were needed to complete the machining and threading on each part. Therefore, tooling is repeated on the other three turret faces so that *two* parts are finished with each revolution of the turret. Production is doubled over the old method . . . time lag is cut to a minimum . . . there's twice the time between tool changes.

This smart setup illustrates one of the many ways Fastermatic Automatic Turret Lathes give you greater efficiency and lower costs on a broad range of jobs. And one operator can usually handle two or more machines. Ask for the facts.



Floor-to-floor time for these pulley flanges is down to 1.75 minutes. Duplicate tools and collapsing taps on the turret rough and finish the bore, chamfer and cut threads. Front and rear slides shave the angle and form the radius on the O.D.



Gisholt 1F Fastermatic Automatic Turret Lathe

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

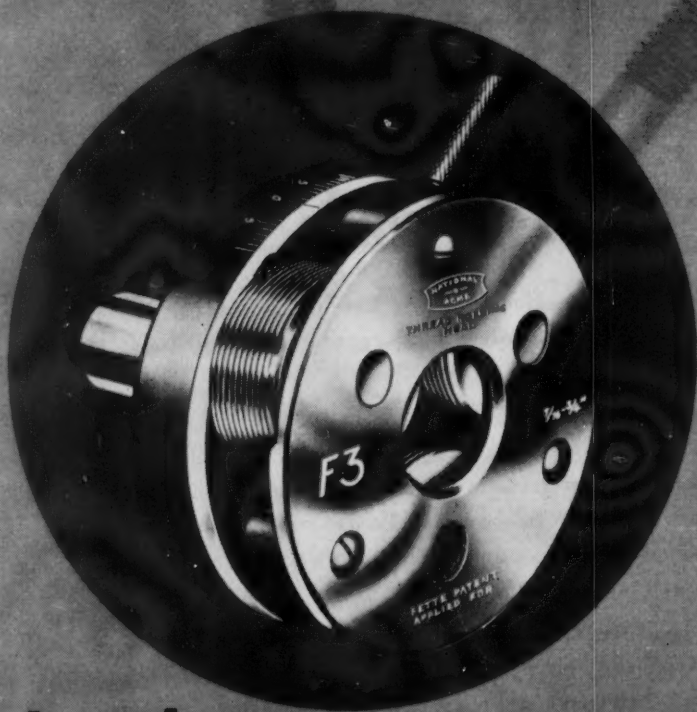


THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

how the Aircraft Industry

with NATIONAL ACME



rolls threads...

**FASTER • SMOOTHER •
STRONGER • CHEAPER
than any other tool**

gets better threaded studs...

"FETTE"

self-opening thread-rolling heads

Precision is a must in the aircraft industry and the threading of studs is no exception. Here, thread specifications call for close tolerances and fine finish in materials that are tough to work with—stainless, high alloy and heat treated studs.

Rolled threads meet the requirements and National Acme "Fette" heads roll 'em at lower cost—save investment in second operation machines and often avoid rehandling because the heads can be applied to primary machining equipment.

These heads generate the thread ahead of the rolls insuring a flow of metal to full thread form without cratering at the crest—smoother, stronger threads with a burnished surface. And rolling speeds are the same as turning speeds with high speed tools.

Bulletin FRH-53 shows specifications of the six head sizes— $\frac{1}{16}$ " to $\frac{3}{4}$ " in non-revolving type head, $\frac{7}{16}$ " to 1" revolving type—or, ask your engineers to talk with ours.

The NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics: 1-4-6 and 8 Spindle •
Hydraulic Thread Rolling Machines • Automatic Threading Dies and
Taps • Limit, Motor Starter and Control Station Switches • Solenoids

ANNOUNCING
DESMOND'S NEW CATALOG
of grinding wheel dressers & cutters



24 pages of information on dressing and truing your grinding wheels with a complete listing of all of Desmond's many types and sizes of dressers and cutters. A worthwhile reference catalog for all users of grinding wheels. Ask your Industrial Distributor for a copy of Desmond's catalog No. 75 or write to THE DESMOND STEPHAN MFG. CO., Urbana, Ohio.

THE ONLY COMPLETE LINE OF GRINDING WHEEL DRESSERS AND CUTTERS

Desmond

THE DESMOND-STEPHAN MFG. CO., URBANA, OHIO

BRYANT GROOVE GAGE



This Bryant gage checks the diameter and roundness of internal grooves up to 5". Four sets of segments are adjustable to cover the range of standard "O" ring grooves and four different sets are adjustable to cover the range of snap ring grooves. A movable segment actuates the dial indicator which gives direct reading of any variation from basic size.

Bryant Chucking Grinder Co., Springfield, Vermont, U. S. A.

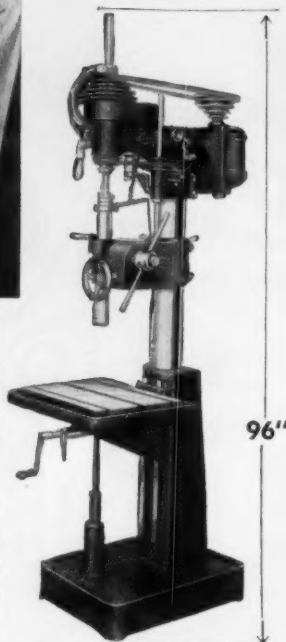
PRODUCTIVE SKILL COMES *Naturally*



with this
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large-capacity
"BUFFALO"
NO. 22
DRILL

You might expect a drill with $1\frac{1}{4}$ " capacity in mild steel to be pretty awkward to operate. This big, powerful No. 22 "Buffalo" Drilling Machine has controls designed and placed for easy operation. The No. 22, suitable for large or small work, gives you a drilling range not exceeded by any drilling machine.

It's built for lasting accuracy, too. The 5.5" column, heavy base and head provide great rigidity. The spindle is 1.312" at least diameter, accurately machined, ground and polished from high grade steel. Write for Bulletin 2989-G on these drills that *encourage* productive skill!



"Buffalo" Pedestal Type No. 22 Drill.
Available in 1 to 4 spindles.



BUFFALO FORGE COMPANY

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*for carbide tool sharpening,
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Bura-Way Grinder...*

**makes
tools last
longer**



BURA-WAY does it better. This Norton Tool Grinder for convex single point and form tools: (1) generates, reproduces and maintains relief angles *constant in the direction of feed*, providing uniform support to the cutting edge and; (2) insures exact duplicates of the master tool form.



When your operator sharpens your carbide-tipped tools on the Norton No. 2 BURA-WAY Grinder he adds longer life value to these tools, helping you to make more profit and turn out better products for your customers.

Precise Duplicates Every Time

In the BURA-WAY No. 2 you have the ideal tool grinder. The BURA-WAY method increases tool life and gives you more pieces per sharpening. By exact duplication of the master tool, tremendous additional benefits may be realized from an effective tool control system and reduced set up time when changing tools.

Find Out More

Get in touch with your Norton representative whose knowledge and experience is further supplemented by Norton trained engineers. Only Norton offers you such long experience in both

grinding machines and wheels to help you produce more at lower cost. Write NORTON COMPANY, Machine Division, Worcester 6, Mass.

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“**RUBBER-CUSHIONED FINISHING GIVES YOU A COMPLETELY NEW SPEED-AND-PROFIT PICTURE!** With Brightboy, you can burr, clean, finish, polish, in one operation, with time savings of as much as 50%!”

Now you can obtain Brightboy compounds *either* with **ALUMINUM OXIDE** or **SILICON CARBIDE**

abrasive grain. *And*—each of these compounds comes in *grain sizes* ranging all the way from *extra coarse* to *extra fine*, in *soft*, *firm* and *tough rubber binders*. You get an abrasive exactly “matched” to your job, and a quality finish that’s frequently the final polish.

Brightboy’s abrasive and rubber work together to give a combination-action that will be a revelation to you—a completely new concept of finishing—applications and time savings far beyond the range of other methods.

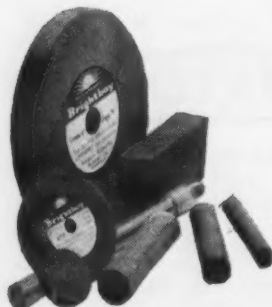
Ask your Dealer **NOW** for Brightboy literature. Advise us if he cannot supply you. Write us on any problem where finishing is involved.

BRIGHTBOY INDUSTRIAL DIVISION

WELDON ROBERTS RUBBER CO.

95 North 13th Street • Newark 7, N. J.

America’s Pioneer Manufacturer of rubber-bonded abrasives



Wheels, Sticks,
Rods, Blocks
for machine and
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Faster ANGULAR SET-UPS WITH GAUGE BLOCK ACCURACY **MAGNA-SINE**

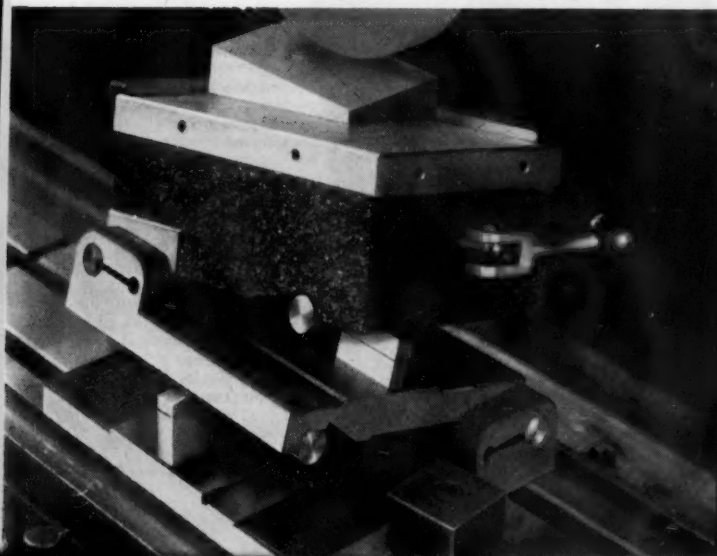
ON angular set-ups the Magna-Sine saves hours of set-up time, provides positive accuracy, holds work securely without distortion.

The Magna-Sine is a quality permanent-magnet chuck mounted on precision hardened and lapped hinged plates. A Table of Constants provided, quickly shows the standard gauge blocks to insert between the plates for any angle—single or compound. Set-ups to gauge block accuracy take minutes, not hours! When closed, the Magna-Sine is used as a conventional magnetic chuck. Thousands are in daily use.

*Write for your free copy of the Magna-Sine Catalog
which shows all styles and sizes . . . price list is included.*

OMER E. *Robbins* COMPANY
Dept. B-1, 5722 TWELFTH STREET • DETROIT 8, MICHIGAN

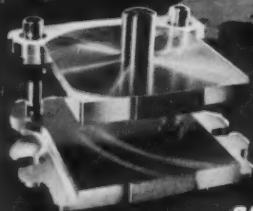
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GRINDING
INSPECTION
DRILLING
BORING
AT
ANY
ANGLE



At Danly's Chicago Plant ...
final broaching to assure
accurate sizing and parallelism
of guide post and bushing holes



*World's fastest die set service
speeds up your tooling program*



DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue
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At a Danly Branch Plant ... complete stocks of die set components
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*DETROIT 16
1549 Temple Avenue
*GRAND RAPIDS
113 Michigan Street N.W.
*INDIANAPOLIS 4
5 West 10th Street
*LONG ISLAND CITY 1
47-28 37th Street

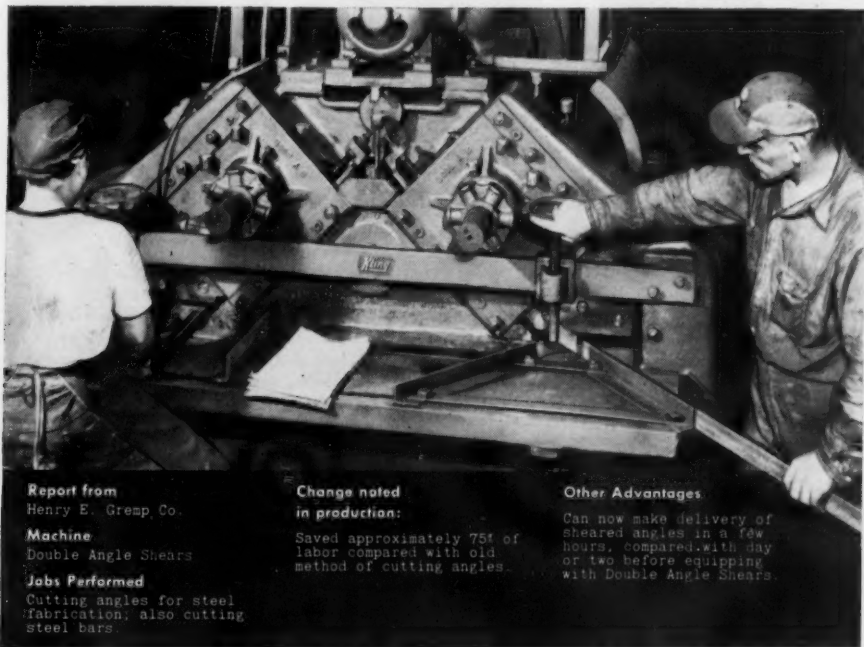
FAST, NATIONWIDE DELIVERY FROM THESE BRANCHES

Danly's new, faster service starts at the main Danly Plant in Chicago where two unique, high-speed, mass production lines are devoted exclusively to the manufacture of interchangeable, precision die set parts. Stocked by Danly Branch Plants in major toolmaking centers, these interchangeable parts are quickly assembled to make up the size and type of die set you need—and delivered to you only a few days after your order is received. Make a note right now of the Danly Branch nearest you from the list given on this page. Next time you need die sets, give your Danly Branch a call. See how they can meet your needs from stock ... and save you time with fast, local service.

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CUT LABOR COST 75%

... now do in **HOURS**, what formerly took **DAYS!**



Report from
Henry E. Grep Co.

Machine
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Jobs Performed
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fabrication; also cutting
steel bars.

**Change noted
in production:**
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method of cutting angles.

Other Advantages
Can now make delivery of
sheared angles in a few
hours, compared with day
or two before equipping
with Double Angle Shears.

Kling DOUBLE ANGLE SHEARS

cut production costs in the "BEST OF COMPANIES!"

This is the latest equipment for fast, production shearing of all kinds... actually two shears in one machine... can handle several jobs at one time. For instance, as shown in the illustration above, the Kling Double Angle Shears at the Henry Grep plant in Chicago, cut angles for steel fabrication on one side and cut steel bars on the other. Flats, angles or rounds all look alike to this "workhorse". If you have considerable mitre shearing, Kling Double Angle Shears can be

mounted on a turntable to facilitate handling. Automatic hold-downs and one-shot lubrication can be furnished if desired. Sizes to handle angles up to 8" x 8" x 1 1/2".

Following are a few of the companies using Kling Double Angle Shears:
Auto Specialties Mfg. Co., Elizabeth Iron Works,
Henry E. Grep Co., Union Iron & Steel Co., International Steel Co.,
Link Belt Company, Joseph T. Ryerson & Co.,
Morris Wheeler & Company, Unit Steel Corporation



Write for free Bulletin that tells you in detail exactly how Double Angle Shears work and what they can do in your shop to save you time and money.

KLING BROS. ENGINEERING WORKS • 1320 North Kostner Avenue, Chicago 51, Illinois

Since 1892

Kling

...an investment in speed!



Friction Saws



Combination Shear
Punch & Coilers



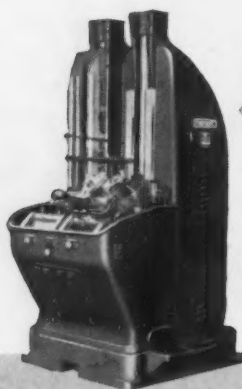
Punches



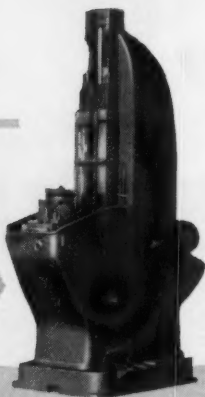
Angle Bending Rolls



Plate Bending Rolls



Duplex Surface
Broaching Machine.
Made in 5, 10, 15 and
25 Ton Sizes.



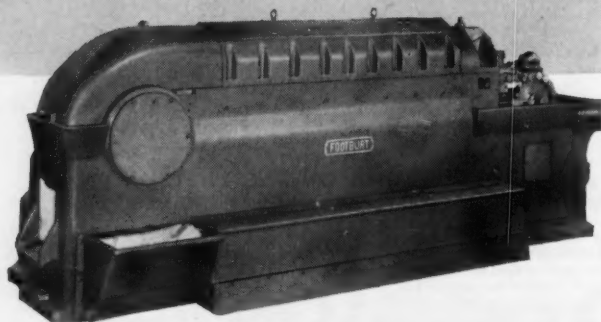
Single Slide Surface
Broaching Machine.
Made in 5, 10, 15 and
25 Ton Sizes.

**A
FASTER
more economical
MACHINING
OPERATION**

● Footburt Surface Broaching may be the answer to your problem of faster machining. Many jobs that were slow and expensive when handled by conventional machining methods are now being produced by Surface Broaching. Production in most cases is as fast as the speed at which parts can be loaded, yet cutting speeds are so low that the cost of tool maintenance shows great savings. Exceptional finish can be maintained. We will gladly discuss your machining problems with you.

THE FOOTE-BURT COMPANY
Cleveland 8, Ohio

Detroit Office: General Motors Building



Continuous Type
Broaching
Machine.
Made in 5 Sizes.

FOOTBURT

SURFACE BROACHING

PRATT & WHITNEY

TRI-ROLL *Thread Comparators*

SOLVE *ANOTHER* QUALITY CONTROL PROBLEM *Requiring:*

A COMPLETE FUNCTIONAL THREAD CHECK...

This requirement in the Quality Control system of a large manufacturer of high quality screw thread fastenings was met by using full length gaging rolls. Errors in lead, angle and pitch diameter are read cumulatively; taper and out-of-round also detected.

PLUS A CRITICAL PITCH DIAMETER

CHECK . . . accomplished by using two-ribbed rolls truncated to $\frac{3}{8}$ pitch crest flat and cleared root.

for a WIDE RANGE OF PRODUCT

SIZES . . . Even the largest, special screw threads are gaged rapidly, accurately and economically. Adaptation requires only simple fixtures.

LET P&W HELP WITH YOUR QUALITY CONTROL PROBLEMS

Use the coupon below to send for Tri-Roll Circular No. 570 . . . or write on your company letterhead outlining your gaging requirements.



PRATT & WHITNEY

DIVISION NILES-BEMENT-POND COMPANY

25 Charter Oak Blvd., West Hartford, Connecticut

Please send my free copy of Circular No. 570

NAME

POSITION

COMPANY

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CITY ZONE STATE

MMS-54

in portable drills

YOUR BEST BUY IS BUCKEYE

360° EXHAUST DEFLECTOR

NOW—an exhaust deflector to satisfy every tool operator, can be positioned anywhere in full 360° circle.



✓ PACKAGE VALVE

NOW—all valve parts can be removed in one unit for inspection, cuts maintenance time and costs.

✓ QUIETER OPERATION

NOW—new design developments have improved the noise factor, make Buckeye air drills more quiet than ever.

✓ MORE INTERCHANGEABLE PARTS.

NOW—identical cylinders on all "A" Series drills, all handle types, permits smaller parts inventory.

✓ PALM-FIT HANDLE

NOW—a tool completely free from annoying projections and angles, fits the hand in an easy, natural grip.

NOW—five important improvements have been added to Buckeye air drills, now more than ever your best buy! These are the drills tool room foremen prefer and tool operators ask to use!

No Buckeye tools in your plant? Then select your air tools by comparison, not habit. We'll be glad to put a Buckeye tool on trial in your plant . . . just tell us where and when, we'll do the rest and let you compare. Naturally, there's no obligation.

Buckeye Tools

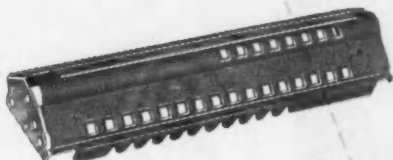
CORPORATION

DIVISION 17 • DAYTON 1, OHIO

producers of
the world's first
successful
rotary air tools

PRODUCTO *Catalog* DIE SETS

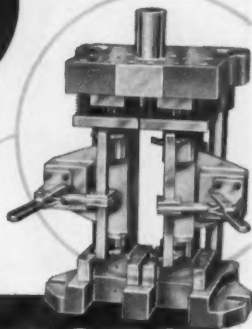
SOLVE SPECIAL STAMPING
PROBLEM FOR MONROE



The Problem:
Stamping end-plate holes in
the carriage cover of the
Monroe Adding Calculator.

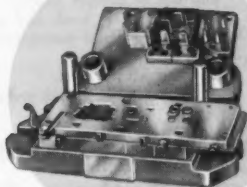
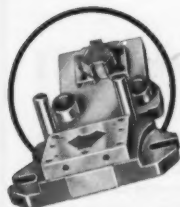


PRECISION



PRODUCTO

new design DIE SETS



THE DIE MANUFACTURER:
The Connecticut Tool
and Engineering Co.,
Bridgeport, Conn.

The lofty die, at right, represents the last critical stamping operation in the production of the Monroe carriage cover, shown above. It's unusual because it pierces close-tolerance end holes in either 10" or 12" covers *after* they have been assembled. The die set that controls this precise piercing operation both looks and performs like a "special" made-to-order set. Actually, it is a rear pin catalog set fitted with 1 1/4" x 16" pins. Even with the long guide pins, the highly accurate parallelism is maintained. Yes, Monroe is getting the benefit of a "special" without paying for extras in time and expense.

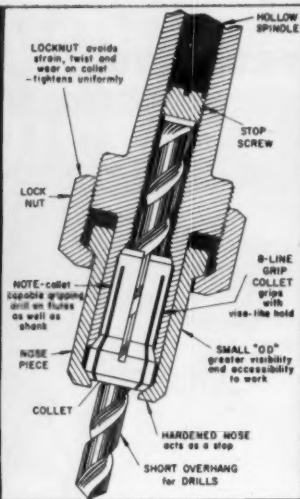
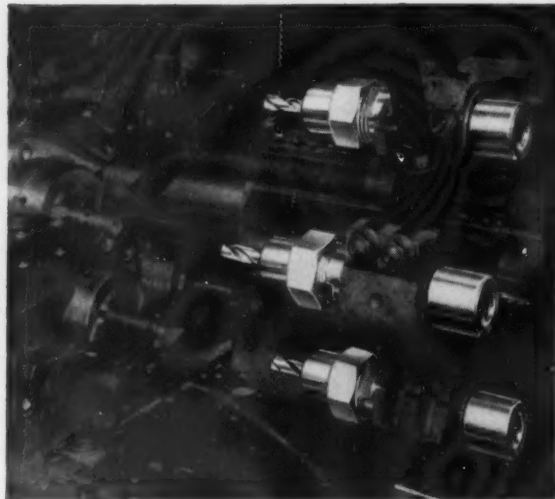
In all, 12 Producto catalog die sets are used in stamping and forming this assembly. Only the one with the long guide pins is unusual in size or shape but *all* require the utmost in precision and dependability. The point to remember is this: Whether you require a "made-to-order" special or a "quick-to-order" catalog die set, you'll get the *best* from Producto.

FOR PRECISION DIE SETS FAST CALL...

THE PRODUCTO MACHINE COMPANY • 910 Housatonic Ave., Bridgeport 1, Conn.

ALSO MAKERS OF DIE ACCESSORIES, FEEDING EQUIPMENT, VISES, MACHINERY.





Precision or Quantity Runs Cost Less when you use Erickson chucks!

After all, these precisely machined chucks are scientifically designed to extend machine accuracy right down to the very end of the tool. No other chuck can guarantee equal accuracy. With Erickson accuracy you frequently reduce the number of operations.

Guaranteed accuracy of .0005" and superior gripping power of Erickson collet chucks assure proper drill alignment. Drills then cut evenly on both cutting lips permitting faster machine feeds and proper speeds... give more holes per grind.

Production run records prove that Erickson chucks repay your investment in less than a month, often in the first week of operation. That's why we can confidently state that *Erickson chucks actually cost you far less!*



ERICKSON TOOL COMPANY

2304-A Hamilton Avenue • Cleveland 14, Ohio

COLLET CHUCKS • FLOATING HOLDERS • TAP CHUCKS • TAP HOLDERS • AIR-OPERATED CHUCKS
EXPANDING MANDRELS • SPECIAL HOLDING FIXTURES

Here's why!

1. More holes per grind.
2. Guaranteed accuracy of .0005".
3. Collet collapses over a range of $\frac{1}{32}$ " replacing seven standard single purpose collets.
4. Grips drills on flutes permitting stubbing and use of broken drills.
5. Permits greater feeds and speeds.
6. Gives better tool performance and extends tool life.
7. Reduces set-up time.
8. Tighter grip with even pressure along entire length of collet.

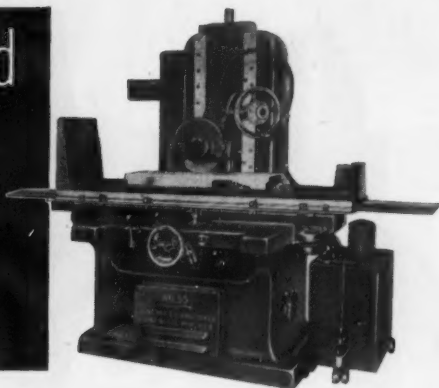
REDUCED TOOL COST, FASTER OPERATION

and **GREATER ACCURACY** mean lower production costs for you. Send for your copy of our new Catalog K today! You'll find many interesting applications for all Erickson holding tools. Let an Erickson field engineer show you actual case histories.

A-10-50



When the need
is for **SPEED**
and
PRECISION



You need a
GRAND RAPIDS GRINDER

Here is extra value, extra accuracy, extra high-speed performance. Every Grand Rapids Hydraulic Feed Surface Grinder has a one-piece column and base for vibrationless rigidity and permanent alignment between cross travel ways and upright headways. Both longitudinal table travel and cross feed are hydraulically operated. On the larger machine the wheel head is powered for rapid vertical travel. *The model 55 has longitudinal table speed of 125 fpm!* All parts are machined to micrometric tolerances and precision assembled for perfect freedom of action and entire elimination of play. That's why 6 out of 10 of these machines are sold to firms already using Gallmeyer and Livingston grinding machinery.



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*We'll answer
within 24 hours*



GALLMEYER & LIVINGSTON CO.

408 Straight Ave., Grand Rapids, Mich.

Please send the following literature without obligation:

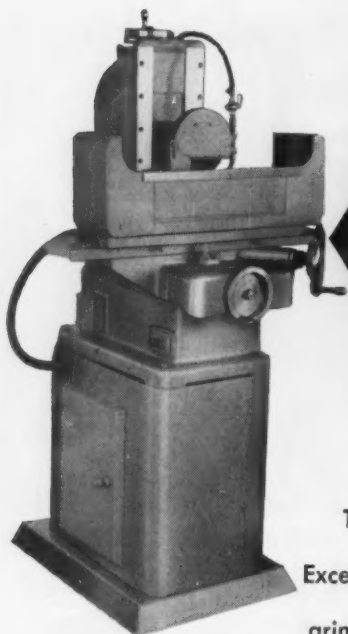
- ☐ Grand Rapids Surface Grinder Catalog
- ☐ Grand Rapids Universal Cutter
and Tool Grinder Catalog

NAME _____

POSITION _____

FIRM _____

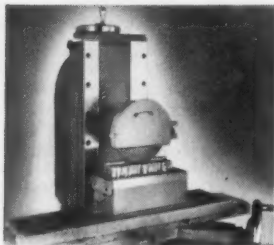
FIRM ADDRESS _____



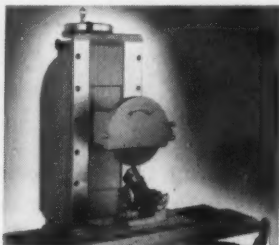
Costs Less
TO OWN, OPERATE, MAINTAIN
Does More Jobs
ACCURATELY, LONGER...

EXCEL No. 7 HAND FEED
SURFACE GRINDER

To replace your old equipment or to relieve your large grinders of small production jobs use the Excel No. 7. It's ruggedly constructed to do a variety of precision production and tool room jobs — grinding tools, dies, chip breakers, thread chasers — Working surface of table 5 $\frac{1}{8}$ " x 10 $\frac{3}{8}$ ".



Grinding steel blocks in production while held on magnetic chuck. Shoulder is also ground with side of grinding wheel square with flat ground surface. Gives precision at a small investment.



Grinding chamfer on thread chasers. Angles established by use of Covel Style A Vise. Accurate location of chaser relative to grinding wheel lets operator hold consistent dimensions for each chaser.



Set-up for grinding chip breakers in single point tools. Covel Style "A" Vise mounts directly on table and establishes proper angles. Diamond wheel may be used for carbide tools.

Complete Specifications and Features
in Bulletin E-84—Write for it today!

COVEL PRECISION GRINDERS
BENTON HARBOR, MICHIGAN

Operators do better on a J&L turret lathe



here's why...

J&L TURRET LATHES GIVE

- MORE Ease of Operation**
- MORE Power Transmission**
- MORE Rigidity**
- MORE Accurate Stops**
- MORE Efficient Lubrication**
- MORE Coolant on Cutting Tools**
- MORE Accurate Results**

This conveniently located single lever enables an operator to select from twelve different spindle speeds, forward or reverse, and to pre-select speed for the next cut while the machine is in operation. The same type of single-lever control is also supplied for both the saddle and carriage feeds.

This is only one of the many important features that are built into J&L Turret Lathes so that operators can turn out better work faster, with minimum fatigue.



Two speed ranges — 30 to 1500 R.P.M., and 20 to 1000 R.P.M. — with a constant speed motor, are available on all J&L Ram Type machines, except the 5-4 1/2, which has speed range of 15 to 750 R.P.M. or 20 to 1000 R.P.M.



JONES & LAMSON



*Machine Tool Craftsmen
Since 1835*

JONES & LAMSON MACHINE CO., 521 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

TURRET LATHE DIV.



JIG GRINDING ACCURACY *guaranteed**

EASILY CONNECT

this jig grinder to jig borer or mill (The "Vulcanaire" has infinite controlled speeds 30,000 to 65,000 R. P. M.)

**Dependably accurate to "tenths"*

For immediate quotation please state machine tool application. Get this manual of photos showing operations Vulcanaire performs. *"Dependably accurate to 'tenths'"*



Vulcanaire
It's built by toolmakers for toolmakers

Then you can finish grind in hardened steel to "tenths" . . . jig grind dowel holes square with a ground base . . . move location of holes in hardened steel blocks . . . jig grind interchangeable holes in hardened sections . . . grind small holes with diamond impregnated mandrels . . . grind contours and relief with tungsten carbide burrs . . . grind radii in die sections . . . eliminate jig bushings in tools where close spacing is essential.

Other infinitely controlled air driven spindle applications

Place spindle on most any machine. Use it for finishing contours on hardened steel working surfaces . . . burring or milling die castings . . . routing wood contours . . . carbide milling or finishing slots . . . finishing holes in hardened steel to "tenths" . . . grinding with diamond wheels, carbide burrs, or diamond impregnated mandrels.

Advantages—10 micro finishes using carbide mills . . . 6 micro finishes using mounted points, operates at any angle . . . air driven, air cooled, overheating prevented . . . speed controlled at optimum point . . . 3 3/4" long motor uses little working space . . . By controlling speed at any point you abolish need for many constant speed spindles.

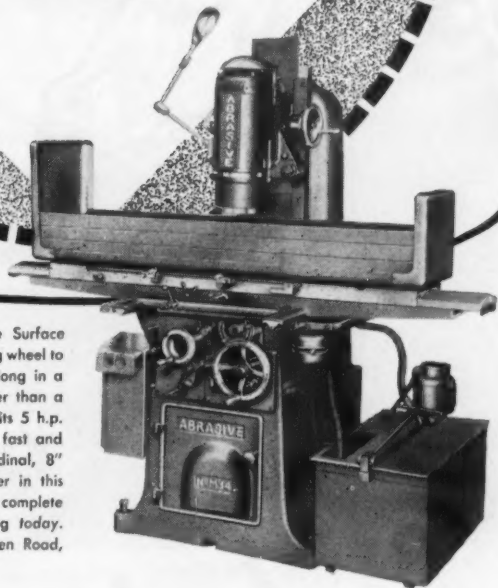
MAJOR VULCAN SERVICES

Engineering, Processing, Designing and Building, Special Tools, Dies, Special Machines including the Vulcan Hydraulics that Form, Pierce, Assemble and Size.

VULCAN TOOL CO. • PRITZ AND HIGHLAND • DAYTON 10, OHIO

Grind Flat Surfaces

FAST



The Abrasive No. M34 Vertical Spindle Surface Grinder puts the face of a 6" segmental grinding wheel to work — grinds pieces up to 4" wide by 24" long in a single pass. This grinder is up to 400% faster than a comparable horizontal spindle machine . . . its 5 h.p. motorized spindle brings parts down to size fast and economically. Work capacity is 24" longitudinal, 8" transverse, 12" vertical . . . the only grinder in this capacity range with a vertical spindle. For complete details, write for Abrasive No. M34 Catalog today. Abrasive Machine Tool Company, 20 Dunellen Road, East Providence 14, Rhode Island.

ABRASIVE
ACCURACY BOOSTS PRODUCTION

Abrasive Quality is Reflected in the Finish of Your Product

ample HORSEPOWER



haskins Flexible Shaft Equipment
For All • Grinding • Sanding
• Filing • Polishing

Haskins Flexible Shaft Tools supply all the power needed without burdening skilled hands with bulky, heavy motors. The Haskins line provides a wide range of models with drives, horsepowers, speeds, tools and attachments—including the one assembly exactly suited for your particular job. Write for the latest catalog.

haskins

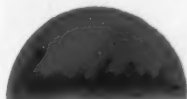
2647 W. HARRISON • • CHICAGO 12, ILL.

...out of the weigh!

For over 35 years—virtually from the beginning of the flexible shaft industry—Haskins has led the field. For Haskins Flexible Shaft Tools are quality designed and built for rugged production work—to stand long, continuous usage. That is why Haskins is standard equipment in hundreds of the most efficient plants throughout the country.

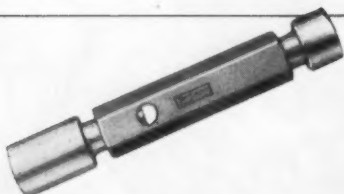


Haskins flexible shaft ("power-away from the job") equipment: up to 2 hp.



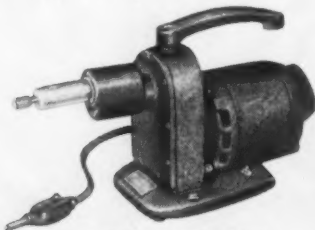
TIPS FROM TAFT-PEIRCE ON:

How to Gage a Hole



IF IT HAS A SIMPLE DIAMETER

T-P Plain Plug Gages save you money where small quantities are involved or where initial investment must be held to a minimum. Furnished in a wide range of materials, there's a gage for every problem — in hardened tool steel — Electrolyzed for longer wear — Carbide, Norbide, or Chromium Plated for exceptional resistance to abrasion or scratching. Emmerton Ball Bearing Pilot Plugs can be provided to eliminate end-wear and scoring of soft materials.



ADD A ROTOCHEK

For Greater Speed in checking threads. Push — and the gage screws into the work. Release the pressure and it stops. Pull — and it disengages. Ideal for mass production. Operators report it doubles to triples inspection rates.



IF IT HAS A THREAD

T-P Thread Plug Gages come in a wide variety of styles and materials. Like T-P Ring and Snap Gages, they're available in alloy tool steels, Electrolyzed, Carbide, Norbide, or Chrome-Plated. This allows you to pick the best combination of cost and wear-resistance for the job.



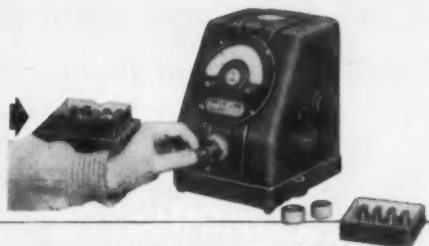
CHECK THE GAGE FOR ACCURACY

T-P Precision Gage Blocks are the ultimate in accuracy. They provide a dependable master against which to check your production gages. Furnished in small or large sets capable of measuring increments down to 0.00005". Carbide Wear Blocks are also available to increase the life of your set.

THE TAFT-PEIRCE MANUFACTURING COMPANY

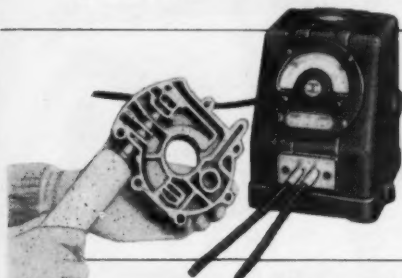
A T-P COMPAIRATOR AIR GAGE

For Greater Speed, Accuracy, Simplicity, and lower maintenance costs. Permits checking diameters from end to end, exploring the work for conditions of taper, out-of-roundness, bellmouth, and other variations. Measures internal diameters as small as .055".



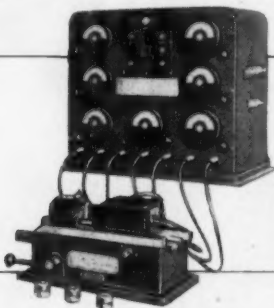
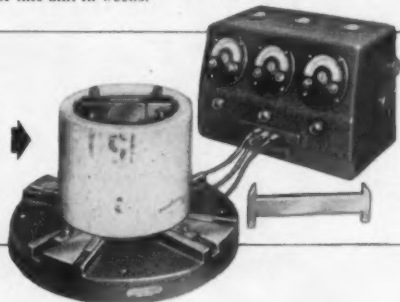
A T-P COMPUTING COMPAIRATOR

For Problems That involve making two or more measurements ... then combining them in a time-wasting calculation — such as determining the center distance or concentricity between two holes without respect to hole size. A T-P Computing Compairator does the whole job. Measures, computes, and indicates the result instantly on a single dial. Eliminates human error. Savings in time and dependability alone usually pay for this unit in weeks.



FOR CHECKING WIDE TOLERANCES

This T-P Multi-Dial Compairator checks several dimensions simultaneously where tolerances are .120". Similar units for tolerances up to .125" can be furnished with any number of indicators and gaging members.



DO IT FASTER, EASIER

T-P Air-Electric Gages simplify multiple gaging problems. Lights flash to indicate oversize or under-size condition, thus saving the operator from checking dials on every measurement.



FOR VERY HIGH PRODUCTION

T-P Automatic Sorting Machines are the ultimate in speed for dimensional inspection. They can be applied to check any reasonable number of dimensions simultaneously. Automatically reject faulty parts, or sort them into size categories.

There's a T-P Gage for Every Gaging Problem. For more information on these and many other items, send for your copy of the Taft-Peircé Handbook.

WOONSOCKET, R. I.



*T-P means
Top Precision*

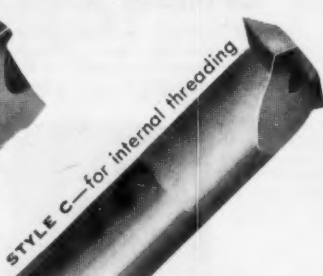
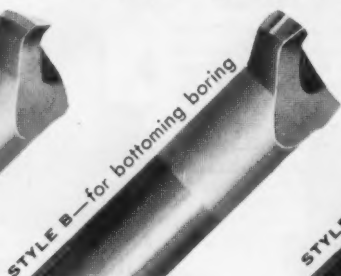
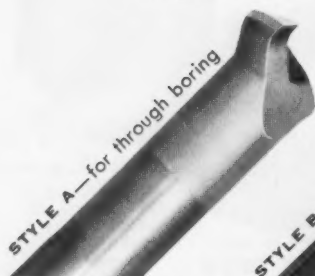
*These phrases briefly describe the Performance
of Bokum Boring Tools*

FAST BORING!

EFFICIENT BORING!

PRECISION BORING!

*Each of the three styles is
designed for its own specialized purpose:*



*All the styles are characterized by the same
UNIQUE FORM*

HELICAL BACK OFF

RESHARPENING ON ONE FACE ONLY

Available in high speed steel, carbide-tipped, solid carbide—in standard sizes and with short neck lengths. Put up in special wooden boxes in a variety of size assortments to meet your specific needs.

Write to Dept. B for complete catalog.

No. 1139-6—HSS

No. 398-6—Carbide-tipped

No. HSS 500—Short neck lengths

No. CT 500—Short neck lengths (carbide-tipped)



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BOKUM TOOL CO.

**14775 Wildemere Ave.,
Detroit 38, Mich.**

more parts...

more operations...

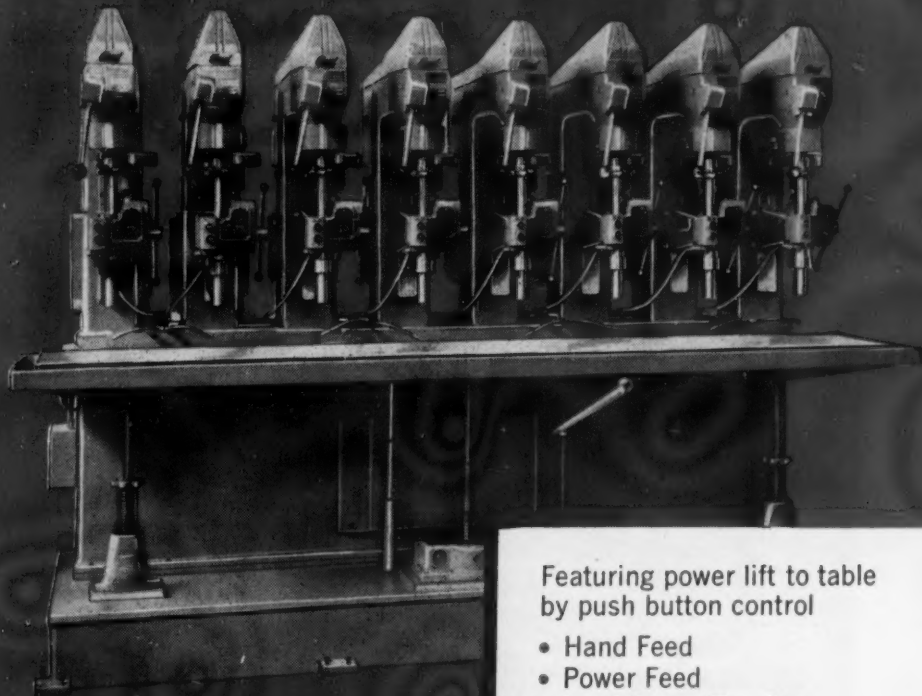
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SUPER EIGHT SPINDLE

No. 2 BMA-6

DRILLING MACHINE



for drilling...tapping...production machines

Featuring power lift to table
by push button control

- Hand Feed
- Power Feed
- Lead Screw Tapping
- Four Feeds
- Six Speeds
- Built-in Coolant System

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THE AVEY DRILLING MACHINE CO., Cincinnati 1, Ohio

Now! Greater than Ever

FACILITIES

**TO MEET YOUR
ASSEMBLING
REQUIREMENTS!**

**POWER
SCREWDRIVERS**

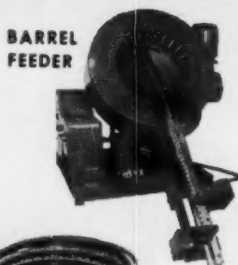
**SELECTIVE
PARTS FEEDERS**

**SPECIAL
ASSEMBLING
MACHINES**

**EXTENDED
ENGINEERING
SERVICE**



**POWER
SCREWDRIVER**

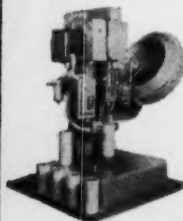


**BARREL
FEEDER**



**BOWL
FEEDER**

● **Action . . . More Action . . .** in your assembly department! **More Speed . . . Greater Accuracy . . . Lower Costs . . .** Vital factors in your production program . . . Advantages available to you through the DPS expanded line and increased manufacturing facilities . . . Tell us your story . . . **Let our trained engineers analyze your problem . . .** Whatever your feeding and assembling operations may be, they will come up with a practical solution.



**SPECIAL
ASSEMBLING
MACHINE**

GIVE US THE DETAILS . . . SEND SAMPLE ASSEMBLY.

DETROIT POWER SCREWDRIVER CO.

2807 W. FORT ST.

DETROIT 16, MICHIGAN

If These Tools
Could Talk
They'd Speak
Precisely!

Brown & Sharpe Machinists' Tools
"tell" you measurements accurately,
dependably . . . minimize the chance
for error due to "touch" or "feel".
This reliability makes your craftsmen
more confident, and confident craftsmen
work faster. That's why it will
pay you to standardize on these
tools of highest quality. Write for
new Catalog 35M . . . a valuable
aid for ordering literally hundreds
of standard types. Brown & Sharpe
Mfg. Co., Providence 1, R.I., U.S.A.



BUY THROUGH YOUR LOCAL DISTRIBUTOR

Brown & Sharpe 

Cooley ELECTRIC HEAT TREATING FURNACES

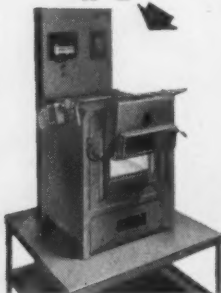
31 MODELS—A Complete Source of Small Heat Treating Furnaces

Cooley Heat Treating Furnaces are used for heat treating operations from 300° F. to 2500° F.

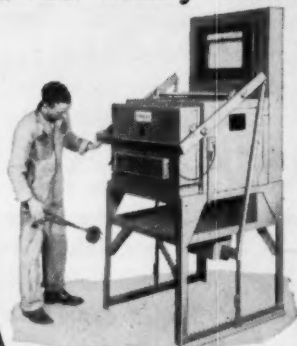
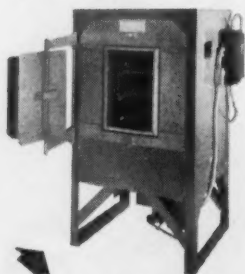
A special Cooley feature is a package unit comprised of furnace and integrally wired control panel, incorporating pyrometer, line switch and fuses—all completely factory wired.

Indicating controlling Pyrometers are available with all Cooley Furnaces.

Bench Type — For tools and small parts — to 2000°F 14 models and sizes to 10" w x 8" h x 18" d.

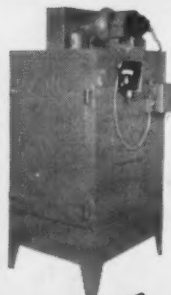


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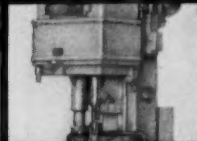
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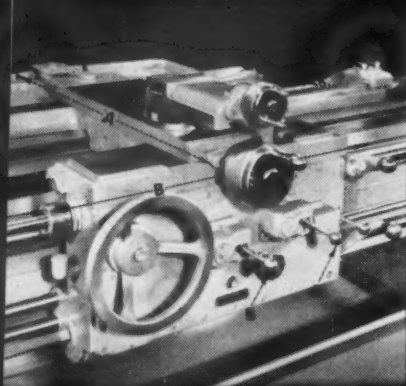
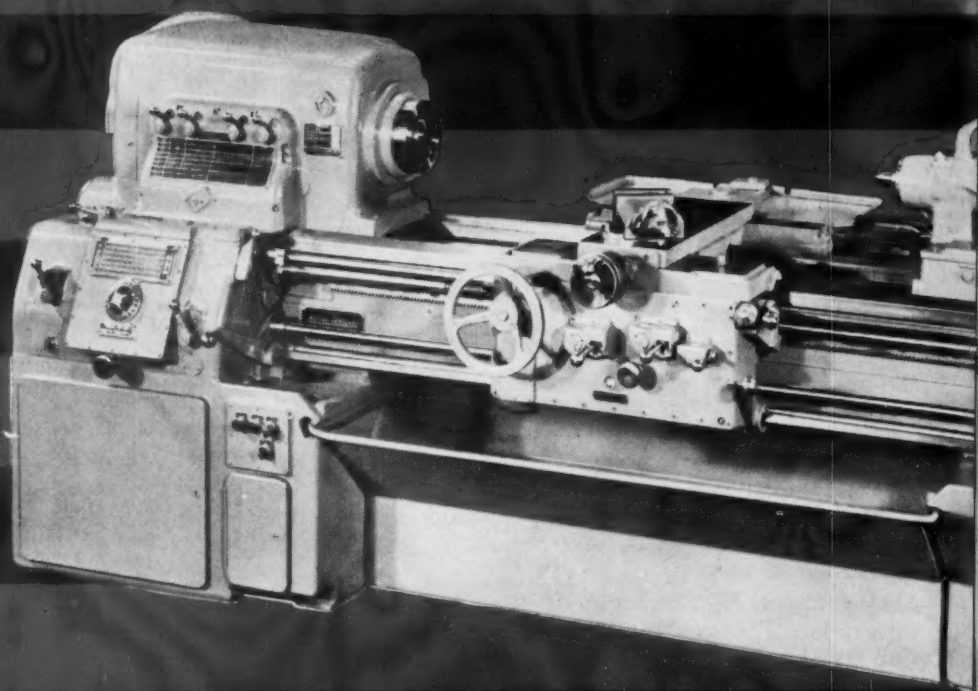
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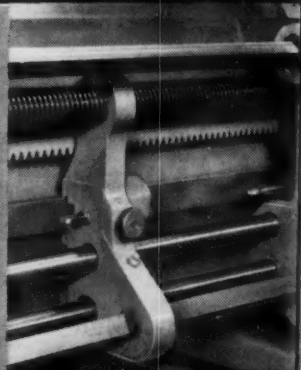
THE NEW MONARCH

SERIES 61

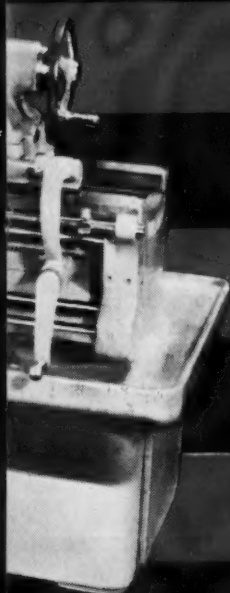


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In addition to the Series 61 four-way power rapid traverse, the machine includes such typical Monarch production features as (1) totally enclosed gear box and end gearing, (2) automatic pressure lubrication, (3) anti-friction bearings by the score, (4) ground or shaved helical gears in headstock, (5) American Standard Camlock spindle nose, (6) flame hardened and precision ground integral bed ways and (7) all critical parts made of hardened alloy steel.

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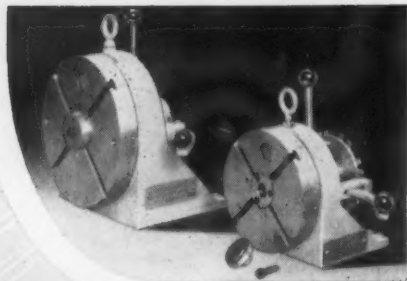
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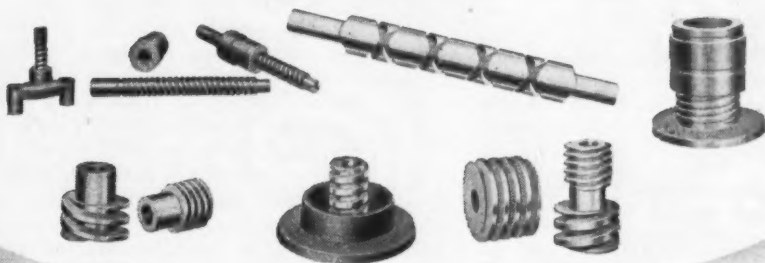
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over the editor's desk

Obsolescence

DURING our visits to various metal-working plants in the past few months we have noticed an increasingly optimistic attitude being taken by personnel in charge of operations toward the replacement of obsolete equipment and the modernization of facilities. It is with pride that many executives now point to their planned programs of replacement in which a definite schedule is set up to show when each major piece of production equipment in the shop will be "retired." The present-day attitude, which is quite evident in many plants, somewhat reminds us of an incident which is said to have taken place many years ago.

It happened at a banquet being held to commemorate the completion of what was then the world's largest steel mill. Andrew Carnegie addressed himself to Charles Schwab who had been in charge of the job.

"Charley," said the boss, "if you had this job to build over again, are there any changes you would make?"

"Sure, boss," replied Schwab. "We learned plenty during the job. I can think of about five million dollars worth of improvements I'd love to make."

"Good enough," said Carnegie. "Start making them tomorrow!"

Whether we earn our livings by building battleships (which are notoriously obsolete long before the final plates are laid) or simply by manufacturing gadgets, there is much to be gained from this spirit of reasonable dissatisfaction with things as they are. Blind prejudices against change; unwillingness to consider impartially the new developments

of apparent real merit; or reluctance to adopt new methods have no place in modern business.

To the Last Drop

WHEN you have a difficult problem to cope with in the shop or at home, it's sometimes comforting to know that other people have their problems too. For instance, like the chap who had twelve bottles of whiskey in his cellar, and was told by his wife to empty the contents of each and every bottle down the sink, OR ELSE! He reluctantly said he would, and so proceeded to the unpleasant task. But, as they say on a well known radio show, we'll leave him tell the story exactly as he lived it, etc., etc.

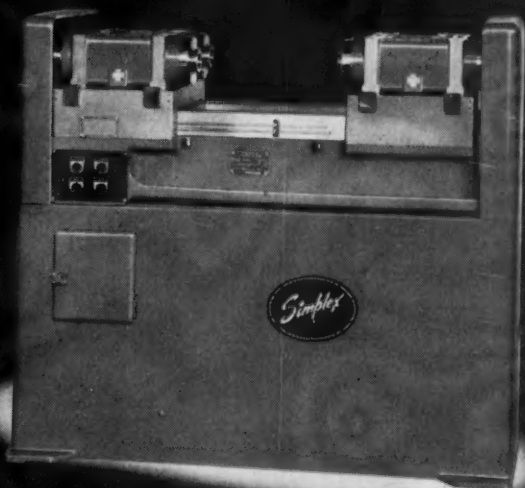
"I withdrew the cork from the first bottle and poured the contents down the sink, with the exception of one glass, which I drank. I extracted the cork from the second bottle and did likewise, with the exception of one glass, which I drank. I extracted the cork of the third bottle and did likewise, with the exception of one glass, which I drank. I pulled the cork out of the fourth bottle and poured the sink down the glass, which I drank. I pulled the bottle from the cork of the next and drank one sink of it, and threw the rest down the glass. I pulled the sink out of the next glass and poured the cork from the bottle; then I corked the sink with the next glass, bottled the drink and drank the pour. When I had everything emptied, I steadied the house with one hand, counted the bottles, corks, and glasses and sinks with the other, which were 29, and as the house came by again, I counted them again and finally had all the houses in one bottle, which I drank."

Simplex

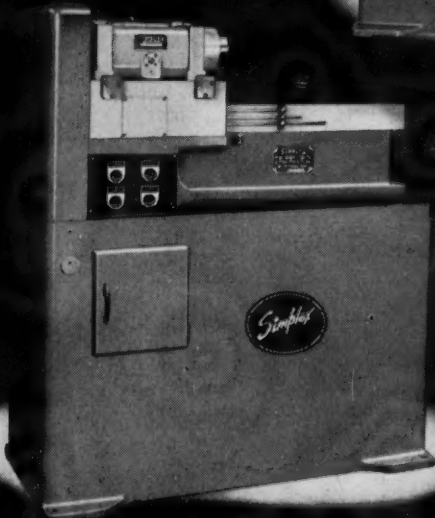
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The new SIMPLEX 2BA and 2BDA Precision Boring Machines are offered at a price that will prove attractive to any shop. These machines provide for a complete automatic cycle at a low cost and can be operated by inexperienced help. The automatic cycle consists of rapid traverse, feed, dwell, and rapid return. After the start button is initially pressed, the above mentioned cycle is controlled by the position of trip bars which actuate limit switches. Feed rate changes can be accomplished during setup through use of feed change gears.

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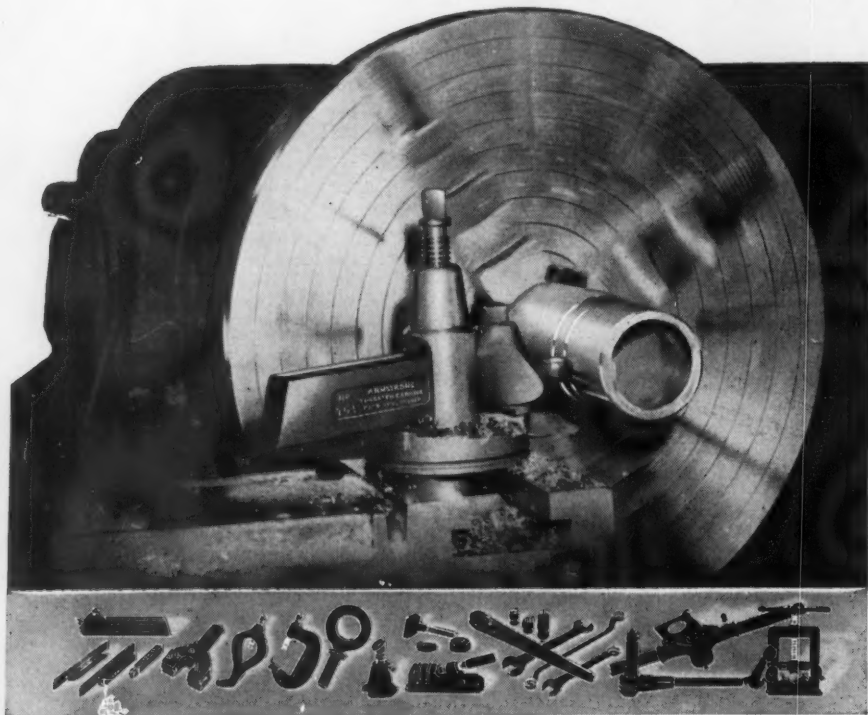
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MODERN Machine Shop

Vol. 27, No. 3
AUGUST, 1954

features
in this issue

Fabricating the Ederer Overhead Crane

By Edward R. Lucas

The author outlines the various machine shop operations performed at Ederer Engineering Company of Seattle in producing virtually all parts used in the construction of overhead industrial cranes. Page 88.

How to Machine Stainless Steels, Part I

By Lester F. Spencer

In discussing this subject, the author covers such topics as stainless steel characteristics, equipment and tool materials used in machining stainless steels, operational procedures, and typical work jobs. Page 97.

Small Shop—Big Business

By Gilbert C. Close

This article provides a verbal blueprint of the successful, steady progress of a small shop producing spray painting equipment and doing a volume business. Page 110.

Machining Stainless Steel

By G. J. Stevens

This case history illustrates and describes an effective setup for matching the end radius of a $\frac{3}{8}$ -in. o.d. Type 303 stainless steel part. Page 118.

Who Gets Promoted?

By Alfred M. Cooper

The author confines his discussion to suggestions for qualifying plant employees for promotion to supervisory ranks. Page 124.

Lathe Chuck Adapted for Multiple Work Holding

By W. M. Halliday

In this article, the author illustrates and describes how an ordinary four-jaw lathe chuck was modified for holding several bearing sleeves so that unusual types of grooves could be machined simultaneously in the sleeves by means of a single cutter. Page 142.

Proper Use of Tolerances Can Reduce Costs

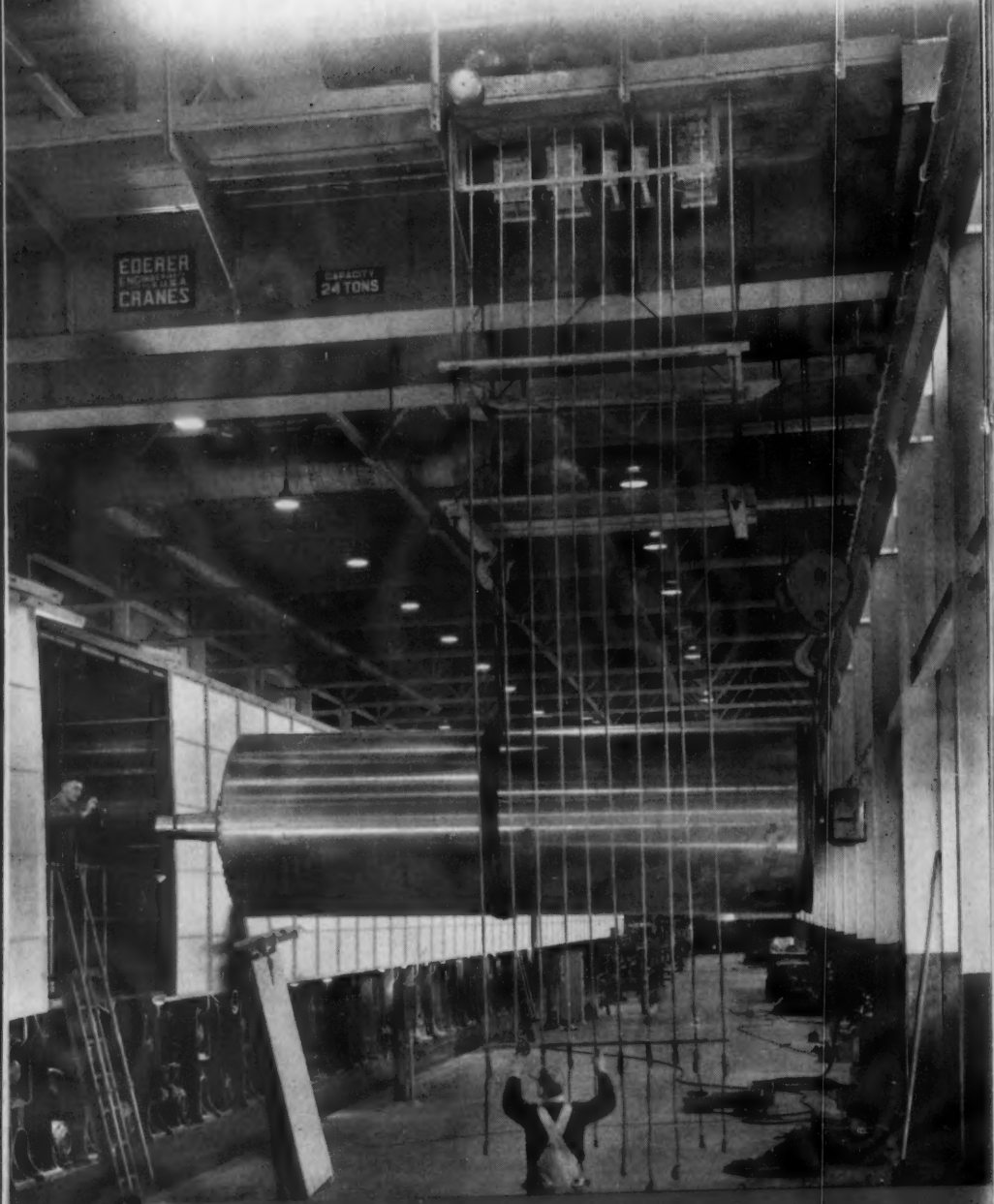
By Charles A. Koepke

In the course of his discussion, the author proposes that the production department be responsible for the selection of total tolerance distribution. Page 154.

Stress Relieving "Gas Caps"

An assembly-line technique developed by Lukens Steel Company for producing stress-relieved heads used in fabricating high pressure steel storage tanks for liquified petroleum is illustrated and briefly discussed in this article. Page 174.

Fabricating the Ederer



Overhead Crane . . .

By EDWARD R. LUCAS

The author outlines the various machine shop operations performed at Ederer Engineering Company of Seattle in producing virtually all parts used in the construction of overhead industrial cranes.

WHERE quantity production techniques cannot be used, standardization of basic operations can still be applied to maintain quality and keep production costs to a minimum. An equally necessary part of that production formula is the constantly developing improvement of those operations.

The formula has served well the machine shop operations of Ederer Engineering Company of Seattle, Washington. The firm has manufactured overhead industrial cranes for most of its 53 years of continuous successful operation. Manufacture of cranes comprises about 75 per cent of the plant's total current output, the balance being accounted for by several units of plywood mill equipment. Its current volume of business requires the services of 80 to 90 employees in fabrication, machine shop, and assembly. President of the company is A. F. Ederer, son of founder E. P. Ederer. The firm's cranes are distributed nationally and are at work in shipyards, steel mills, warehouses, foundries, machine shops, and other heavy industrial establishments.

Because of the individual dimen-

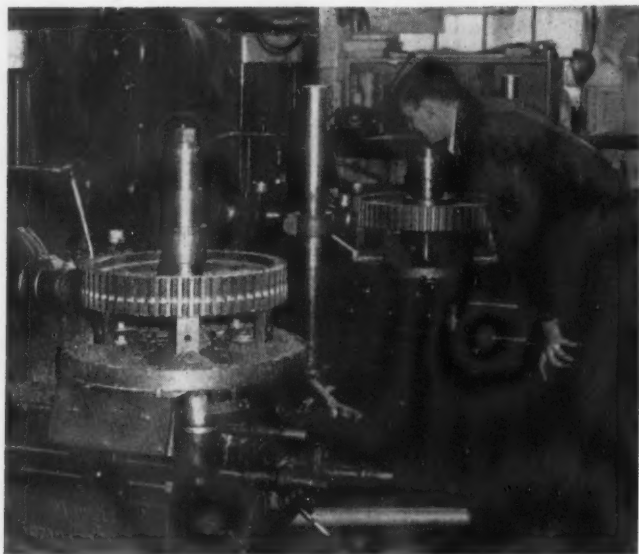
sions of each industrial plant in which a crane is mounted and the special requirements of each material handling problem, there can be no mass production of crane parts or assemblies. Each crane must be built to its individual specifications and must be engineered accordingly.

Notwithstanding, procedures have been developed in the Ederer machine shop which have enabled the shop to improve its product and reduce the time required to make it. The same procedures could be adapted to similar operations on other machined products.

The shop manufactures virtually all parts that go into an Ederer crane, including the gears. For a typical Ederer crane that was recently completed, 20 gears were required. These included 6 gears for the hoist mechanism gear case, 6 gears for the trolley drive gear case, 4 gears for the bridge drive gear case, 2 pinions for the drive shaft and 2 gears for the end trucks. The largest gear, for the hoist drum, was over 36 inches in diameter.

As with most of the shop's cranes, all were spur gears, with a minus tolerance for tooth thickness at the

(Illustration) Ederer overhead bridge crane in operation in a paper mill. Due to special handling problems, controls in this instance are manual type instead of push-button station type used on almost all the company's new cranes.



Hobbing two large spur gears on the shop's two gear hobbers.

not a press fit.

The method is much more satisfactory than a slip fit on the shaft and a press fit on the key, Mr. Lovgren notes. With that kind of assembly, a gap of several thousandths inch clearance is often opened up be-

pitch diameter of 0.002 inch. A backlash of 0.005 in. was permitted on the smaller gears, and up to 0.012 in. on the largest. The teeth were cut in the machined castings on the shop's three gear cutting machines which include two gear hobbers and a Sykes gear shaper. The shaper is used on gears requiring a smoother finish.

All gears are assembled to their shafts by press fit and are keyed. A procedure here that has meant better crane performance is the method the shop has developed of forcing the gear onto the shaft with a hard press fit, shop foreman Carl Lovgren says. With the smaller shafts of 2 to 5 or 6 in. in diameter, the shaft is machined from 0.001 to 0.005 in. larger in diameter than the bore in the gear. With the large drum gear, an interference of 0.010 to 0.015 in. is provided. Assembling is done with the shop's 250-ton press. The key is

tween the shaft and the edge of the hole adjoining the key. That puts the gear out of alignment and causes the gears to whine and wear more rapidly in operation. With a hard press fit on the shaft, on the other hand, the gear lines up properly and the thrust is transmitted through the shaft fit instead of through the key. The function of the key is to hold the shaft securely in position so that it does not start to "work" in the bore.

There are three gear cases on most Ederer cranes, and all require rather critical machining operations. With the cast iron cases, the connecting faces of the flanges on the top and bottom castings are first milled on a Cincinnati Gilbert milling machine. The bottom surface of the bottom casting is also milled on that machine, as are any other milled surfaces.

The two sections are then bolted

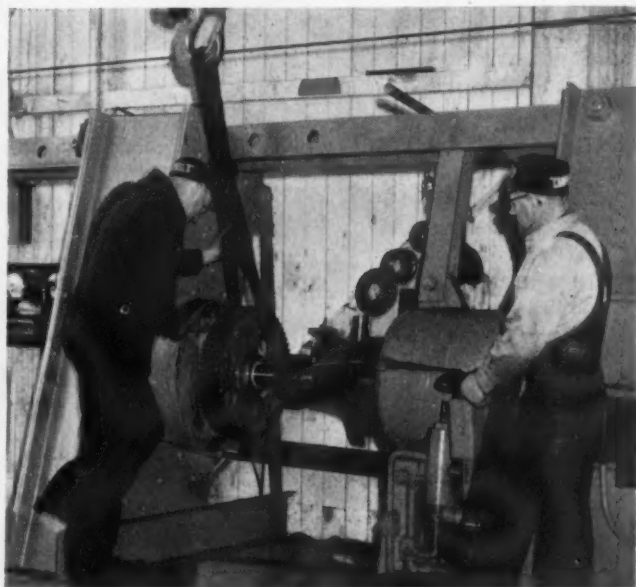
together and dowel pins inserted through the flanges to achieve exactly identical alignment at assembly. The assembled sections are then set up in the Cincinnati Gilbert horizontal boring, drilling and milling machine and holes are bored for the bearings for the gear shafts. The tolerance of plus 0.010 in. that is held for most center line to center line dimensions is easily maintained with this setup, as are locating dimensions with the milled surfaces. A similar procedure is followed with the fabricated cases with which the shop has recently been experimenting.

The horizontal milling machine has also been used to good advantage in line boring the bearing housings for the wheel axles of the trolleys. Mr. Lovgren estimates that use of this machine has reduced the time formerly required for this operation by one-half.

The trolley is the platform that rides on the rails on top of the girders, traveling across the span at right angles to the direction of travel of the crane. It holds the hoist

mechanism and the trolley drive, including motors and gear cases, and also brakes. In a few cases, the control cab is also mounted to the trolley but with most cranes the trolley, hoist and brake mechanisms are controlled from cab or cable stations below. Where an auxiliary hoist is used, space for the auxiliary unit's gears, motor and drum must also be provided.

Basic construction of the trolleys is done in the structural shop, using welded plate steel. The welding is completely finished before the openings are cut in the top or any machining is performed. The pads on the upper side of the trolley that hold the gearboxes, drums, motors and brakes are welded and then machined to the required dimensions. Here, Mr. Lovgren has found that by machining the pads $\frac{1}{8}$ or $\frac{1}{16}$ in. under the nominal dimension, as-



Pressing gear on shaft. Several thousandths inch of interference is provided on all press fits so that the power transmission is through the fit rather than through the key.

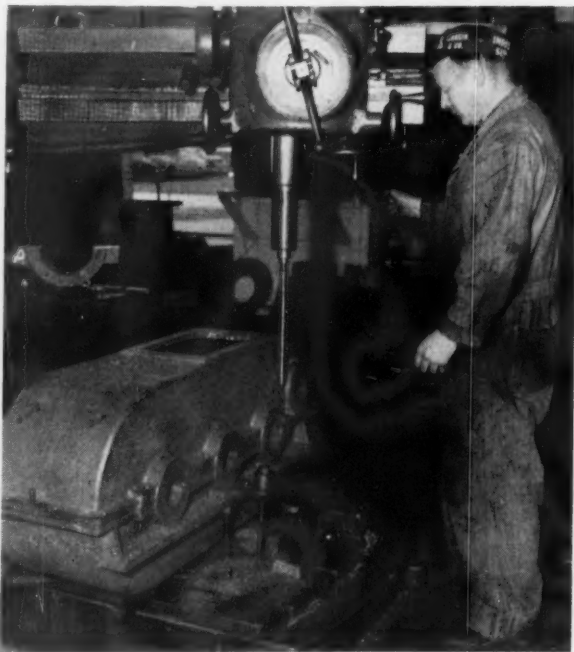


Shop foreman Carl Lovgren shows how flange has been pressed over shaft and keyway in part of a drive shaft assembly.

pension points is critical here, as are the hole diameters for the axle bearings. Use of the boring, drilling and milling machine enables the machinist to maintain close control over these critical dimensions.

Hoist drums for winding the steel cable are a necessary part of every hoist mechanism. They are machined from steel castings on a lathe. The principal operations here are machining the helical grooves for the cable and

sembly of the different units is facilitated. In assembling, standard $\frac{1}{8}$ or $\frac{1}{16}$ -in. shims are used to bring the pad to the specified dimension; however, if adjustments are required, it is much easier to make the adjustments by changing the thickness of the shims than it would be if the pads were maintained to their full nominal dimensions. When the pads have been machined, the trolley frame is set up on the horizontal milling machine upside down and positioned on the pads for line boring of the cast steel bearing housings. Alignment of these four sus-



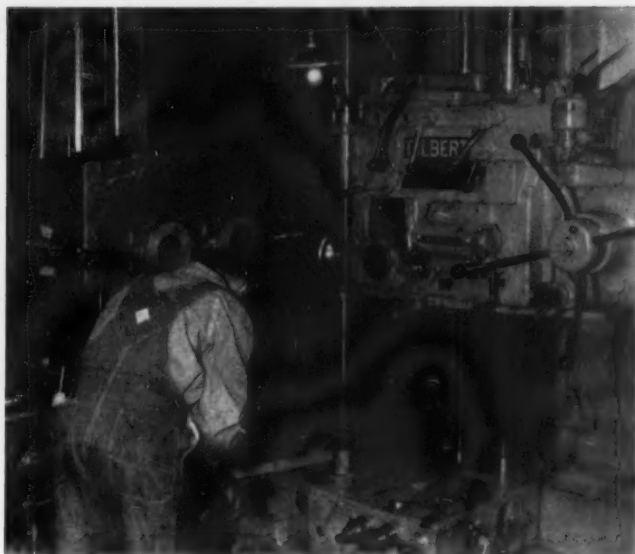
Drilling the flange of a gear-box. Note taper pin already inserted in flange.

Milling the bosses on a gearbox with a Cincinnati Gilbert machine.

gear and boring a hole in each end of the drum for the bearing shaft.

In the first setup, the drum casting is held at one end in the faceplate chuck and at the other end with a pipe center in the cast hole. This end is trued up by shims so that the cast surfaces are reasonably true and concentric. The casting is made with a "stem" at each end about 6 in. long, most of which is turned off after the bearing hole inside has been bored to its finished depth and diameter.

The first machining operation is to turn a "collar," just deep enough to clean up, on the outside diameter of the stem that is held in the faceplate chuck. The casting is then reversed so that the end with the un-machined stem is held in the faceplate chuck jaws and the other end is held in a chuck with the jaws clamped around the turned collar. This permits the bearing hole to be bored in that end and the helical grooves to be machined in the same setup, if desired. A similar procedure is followed in boring the hole in the opposite end of the casting. The excess stock of the stems is turned off



after the holes have been bored.

The helical grooves are turned with a forming tool, the diameter of the cut being just large enough to accommodate the diameter of the cable that will be used. The depth of the cut is a little less than half the diameter of the cable, so that with a $\frac{7}{8}$ -in. cable, the depth of the grooves will be about $\frac{3}{8}$ inch. The diameter of the drum is also determined by the diameter of the cable, as it must be large enough so that there will be no kinks or strain on the cable. A $\frac{1}{2}$ -in. cable requires a drum about 36 in. in diameter. The diameter of the drum at the bottoms of the threads is quite critical, since a small reduction of the diameter would mean a substantial reduction in its cable carrying capacity.

Besides the trolley frames, the principal fabricated parts of Ederer cranes include the girders, cab and walk, and bridge trucks. One of the

most critical of these is assembly of the box section type of girder that is used in all but the smallest cranes. About nine years ago, the company changed from riveted to all-welded construction, with resulting improvement in strength and reduction in weight of the assembly.

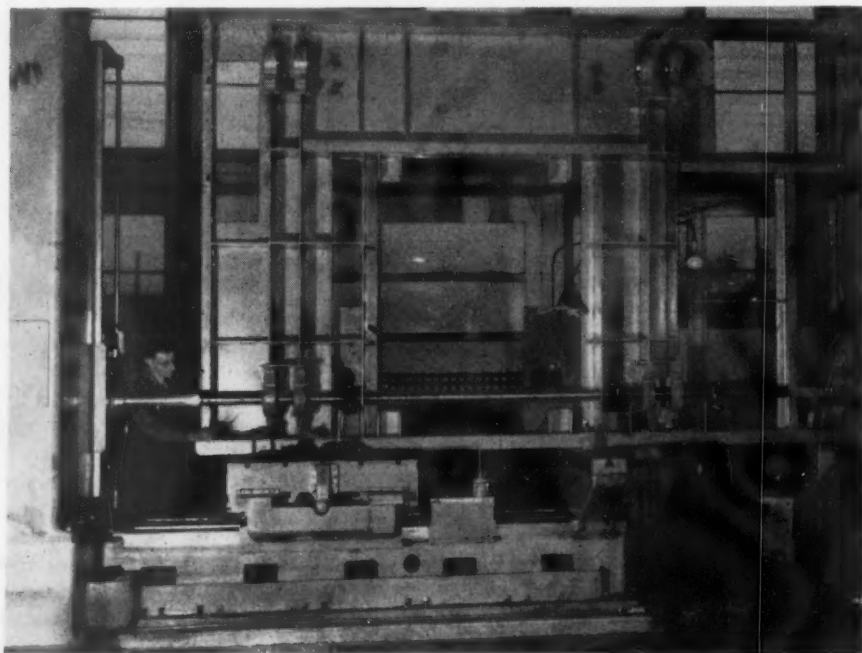
A principal problem in welding the girders is warpage. The company's standard requires that the assembled crane shall be true within a tolerance of only 1/16 in., which is cutting it quite fine on a 60 or 100-foot span. However, maintaining a close tolerance here eliminates operating trouble and means longer wear for the equipment. The end-to-end check on the assembled bridge

is made with a transit and a special type of rod.

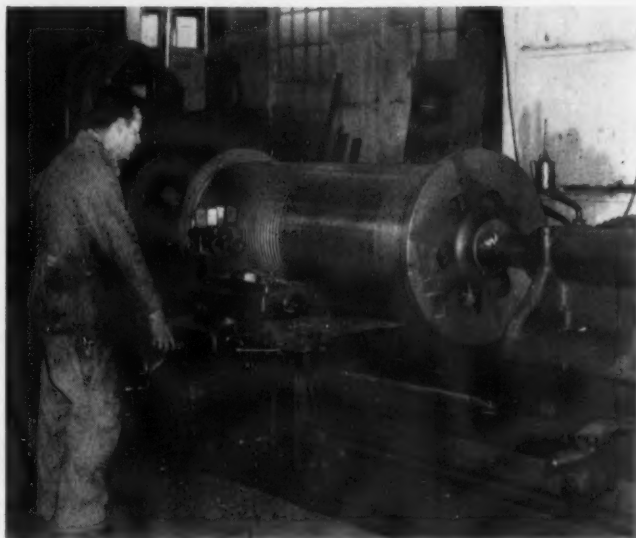
Warp-free welding has been achieved by following a special procedure that begins with tack welding the diaphragm plates to the top plate, the assembly being put together upside down. The diaphragm plates consist of full length and short intermediate diaphragms. The web plates are then tacked onto the top and the diaphragm plates, after which the welder must get inside each compartment to do the finish welding. This is done by skip welding.

The outside weld of the web plates to the top and bottom plates is a continuous weld on each side for the

Line boring a trolley on a Cincinnati Gilbert. In most instances, the trolley is set upside down; however, with this large trolley it is set up on edge.



Turning the helical grooves on a cable drum. This particular view shows the beginning, shallow cut.



full length of the girder. This welding is done by two welders working simultaneously on opposite sides of the girder. The temperatures of the welding units and their positions on the girder are controlled by a special synchronizing device. The device assures that the units are directly opposite each other and that the welding temperatures are the same throughout the entire welding process.

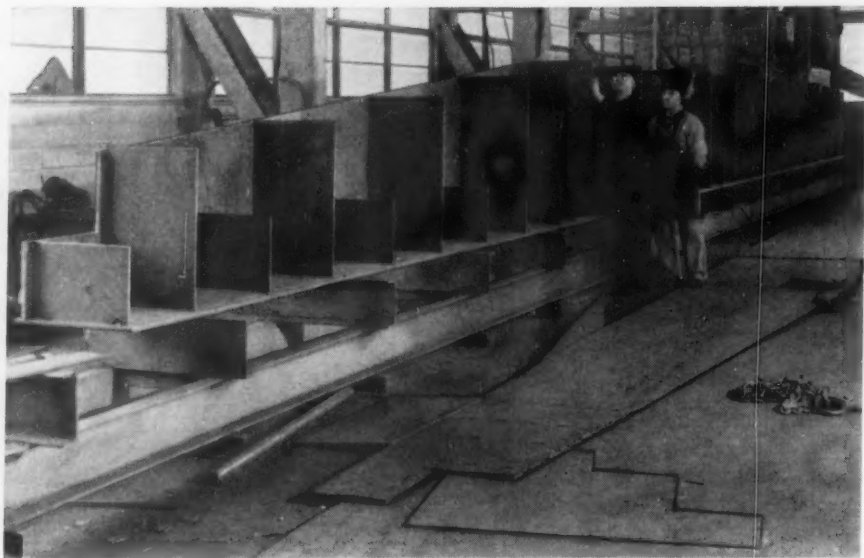
As a result of this procedure, the girder assembly is straight, square and rigid; and the diaphragm construction assures that the load on the rail will be transmitted through the diaphragm plates to the web plates. The rail is held to the top of the girder with rolled steel clips which are welded to the top plates. Rail sections are welded into a single rail unit. Each girder is made with sufficient camber so that the bridge will be level with a full capacity load at the center of the crane.

The girders are connected to the two-wheel end trucks through full wing plates welded in the girder notch. Girders and trucks are connected with body-bound bolts

through drilled and reamed holes. This drilling and reaming operation is performed after the crane has been assembled and squared up. With heavy duty steel mill cranes a saddle type connection is used, with four-wheel pony trucks at each end.

The drive shaft is usually mounted on the steel walk at the side of the drive girder, with the motor and gearbox in the center of the girder span. Direct drive is used where it is necessary to have dustproof operation. In most other designs, the drive shaft transmits its power through a forged steel pinion to a cast steel gear which has been pressed and keyed to the rotating wheel axle. Numerous safety devices have been built into all units. Location of controls depends on the type of crane and its uses, with both cab and push-button control stations being the most common.

Ederer's checks all equipment be-



Welding the diaphragm plates of a 100-ft. girder. Note other web plate on floor.

fore shipping it out by assembling and giving it full operational tests. The equipment is then dismantled so that the major units can be packed separately for shipping.

A recent innovation that makes assembling easier for the purchaser has been the taking of photographs

of parts of the assembled crane by Charles W. Lussier, the firm's advertising manager. Copies of the photos are sent to the purchaser as part of his assembly instructions. This service simplifies considerably the assembling of the machinery at the job site, Mr. Lussier explains.

Realistic Depreciation Policy. Published by Machinery and Allied Products Institute, 120 S. LaSalle St., Chicago 3, Ill. 222 pages. Charts and tables. Cloth binding, board covers. Price, \$6.00.

This book contains the results of the Machinery and Allied Products Institute's extensive research study of depreciation policy and thoroughly analyzes depreciation as treated for tax purposes and from the standpoint of internal management policy. The book's analysis of the true pattern of

capital consumption and the proper allocation of this cost of production over asset life provides a foundation for more informed and intelligent decisions on many matters of management policy affected by depreciation allowances and presents a sound basis for management review of depreciation accounting methods. The study will serve as an important reference work for accounting and financial officers and other management executives, as well as for public accountants, tax lawyers and educators.

How to Machine Stainless Steels Part I

By LESTER F. SPENCER*

In discussing this subject, the author covers such topics as stainless steel characteristics, equipment and tool materials used in machining stainless, operational procedures, and typical work jobs.

DUE to the individual characteristics as displayed by the stainless steels, standard machining practices are somewhat altered as compared to that practiced for the carbon and lower alloy compositions. In considering the relative machinability of these materials, it is necessary to evaluate such factors as, (a) the chemical composition; (b) the structural condition of the material, i.e., whether the base composition is basically within the ferritic, martensitic or austenitic grouping; (c) the design of the part to be machined, which will usually dictate the operational sequence; (d) the type and condition of equipment; (e) both tooling materials and tool design; and, (f) type and method of application of coolants.

The stainless steels can be conveniently divided into three basic groupings, each group being identified by its structural condition. Within this group classification, those alloys which are identified as the ferritic alloys offer less difficulty

in machining than either of the other two alloy groups. The greater difficulty experienced in machining the martensitic alloys is undoubtedly due to the higher percentage of carbon within the base analysis, apparently the abrasive action of the resultant chips on the tool increasing proportionally to the carbon content within the analysis.

Those inherent properties of both "toughness" and "work hardening" of the austenitic alloys, commonly identified as the "chrome-nickel" stainless steels, are responsible for the difficulties encountered in the machining of these materials. Thus, in order to overcome these difficulties, it is generally recommended that heavy feeds be employed combined with a constant cutting action. The reason for this recommendation is to realize a sufficient depth of cut to get under the cold worked surface produced by the previous cut. Where this is not observed, a glazed surface is obtained, the hardness of which is extremely high and the resultant difficulties in further cutting increasing considerably. Usually,

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CHARACTERISTICS

AISI Type No.	Carbon	Manganese (Max.)	Phosphorus (Max.)	Sulfur (Max.)	Silicon (Max.)	Chromium	Nickel	Other Elements
410	0.15 max.	1.00	.04	.03	1.00	11.50-13.50		
403	0.15 max.	1.00	.04	.03	.50	11.50-13.00		
405	0.08 max.	1.00	.04	.03	1.00	11.50-13.50		Al 0.10-.30
414	0.15 max.	1.00	.04	.03	1.00	11.50-13.50	1.25-2.50	
416	0.15 max.	1.25	Note	Note	1.00	12.00-14.00		Mo or Zr 0.40 max.
420	Over 0.15	1.00	0.04	0.03	1.00	12.00-14.00		
420F	Over 0.15	1.00	Note	Note	1.00	12.00-14.00		Mo or Zr 0.40 max.
430	0.12 max.	1.00	.04	.03	1.00	14.00-18.00		
430F	0.12 max.	1.25	Note	Note	1.00	14.00-18.00		Mo or Zr 0.40 max.
431	0.20 max.	1.00	.04	.03	1.00	15.00-17.00	1.25-2.50	
440A	0.40-.75	1.00 *	.04	.03	1.00	16.00-18.00		Mo 0.25 max.
440B	0.75-.95	1.00	.04	.03	1.00	16.00-18.00		Mo 0.75 max.
440C	0.95-1.20	1.00	.04	.03	1.00	16.00-18.00		Mo 0.75 max.
440F	0.95-1.20	1.00	Note	Note	1.00	16.00-18.00		
446	0.35 max.	1.50	.04	.03	1.00	23.00-27.00		N 0.25 max.
Over								
301	0.08-.15	2.00	.04	.03	1.00	16.00-18.00	6.00-8.00	
Over								
302	0.08-.15	2.00	.04	.03	1.00	17.00-19.00	8.00-10.00	
304	0.08 max.	2.00	.04	.03	1.00	18.00-20.00	8.00-10.00	
303	0.15 max.	2.00	Note	Note	1.00	17.00-19.00	8.00-10.00	Mo or Zr 0.40 max.
309	0.20 max.	2.00	.04	.03	1.00	22.00-24.00	12.00-15.00	
316	0.10 max.	2.00	.04	.03	1.00	16.00-18.00	10.00-14.00	Mo 2.00-3.00
321	0.08 max.	2.00	.04	.03	1.00	17.00-19.00	8.00-11.00	Ti 5 x C min.
347	0.08 max.	2.00	.04	.03	1.00	17.00-19.00	9.00-12.00	Cb 10 x C min.

Note: Phosphorous, Sulfur or Selenium—0.07% min.

Type 410 is a low alloy stainless steel type suitable where severe corrosion problems are not a concern. Hardenable by heat treatment, it is used extensively in bar and wire for screws, bolts, valves, pump shafts, stoker feed screws, etc. Type 403 is essentially the same as Type 410 but is especially selected for steam turbine blades, other highly stressed parts. Aluminum content and low carbon make Type 405 essentially non-hardenable. Used in welded and cast-in assemblies.

The addition of approximately 2% nickel to the Type 410 analysis produces a steel of greatly increased strength in both the annealed and cold worked conditions.

The free-machining partner grade of Type 410, widely used for production runs on automatic screw machines at speeds approaching Bessemer screw steel. Short, brittle chips are characteristic of this grade.

Two of the Armco family of high carbon stainless steels, ARMC0 13-C-35 and 13-C-35FM can be brought to high hardness by heat treatment. Used for cutters, dental and surgical instruments and similar applications requiring high abrasion and good resistance to corrosion. The high carbon content and low alloying elements give a favorable action on tools. Carbide-tipped or high-coalt cutting edges are suggested.

Popular chromium grades in regular and free-machining variety, non-hardenable by heat treatment. Used where high strength and resistance to oxidation are desired. Heat scaling superior to Type 410 group are required. Type 430F machines at speeds approaching 85% of Bessemer screw steel—produces short, brittle chips.

ARMC0 16-2 has high strength in both the annealed and cold worked conditions, as well as the best corrosion resistance of any of the martensitic grades of stainless steel. Desirable where a combination of high strength, toughness and resistance to salt spray are required.

These 17% chromium stainless steels with three ranges of carbon content provide a greater degree of hardenability and corrosion resistance than ARMC0 13-C-35. They have excellent edge-retaining qualities and are used extensively for carving knife blades, surgical and dental tools. ARMC0 17-C-100FM offers approximately 10% improved machining speeds over the other grades on screw machine equipment.

Type 446 is used almost exclusively for high temperature scaling resistance at temperatures up to 2000° F. in both oxidizing and reducing atmospheres.

Type 301 is the standard grade for structural purposes as it combines maximum strength with maximum workability. In addition, it is used for such products as cream separator discs, wire springs, flatware, etc.

These basic stainless steel types are non-hardenable by heat treatment but work-harden faster than the chromium types. Consequently, tools must not ride or glaze the surface without cutting. For turning, where possible, use heavy feeds and slow speeds. As chips are very tough, chip-curler tools are recommended when applicable. Either sulfur or a combination of selenium and phosphorus are added to produce this 18-8 free-machining grade. The sulfur-bearing type is preferred for work involving heavy feeds or deep cuts; the selenium type where a high surface finish is required.

Type 309 is primarily a heat resisting grade. As with Types 302 and 304, chips are tough and stringy, so tools with a chip-curler grind are advantageous when used.

Type 316 offers resistance to pitting in chemical applications superior to Types 302 and 304. It has high creep and high tensile strength at elevated temperatures.

These types, with titanium and columbium additions, are the "stabilized" grades used optionally for the elimination of intergranular corrosion by the prevention of harmful carbide precipitation. The same machining suggestions as well as precautions given for the other chromium-nickel types, 301, 302, 304, 309 and 316, apply.

Table 1—The chemical composition and characteristics of a number of stainless steel compositions are given in this table. Table courtesy Armco Steel Corporation.

where less chip pressure is required, the speed utilized in machining the austenitic alloys is reduced rather than permitting a reduction of the feed.

However, in all three basic groups, there are the so called "free machining" grades, formulated so as to produce chips that have a lesser tendency to curl. Thus, as indicated in Table 1, these free machining types within each group include, (a) type 430F within the ferritic group; (b) types 416, 420F and 440F within the martensitic group; and (c) type 303 within the austenitic group. These free machining types of stainless are more frequently used due to the increased speeds that are permissible when compared to the non-free machining stainless types. This is particularly true when automatic equipment machines parts from bar stock at a high production rate.

Thus, it has been stated that the free cutting grades are machinable at speeds approximately 85 per cent of that used in machining Bessemer screw stock, and that the chips produced are short and brittle. However, this statement does not apply to the high carbon stainless, as exemplified by type 440F, due to the previously mentioned abrasive action of the chip, the increased cutting speed usually given being about 10 per cent above that used for the comparable non-free cutting analysis. Based on the use of high speed tooling, the average feeds and speeds suggested for the various grades of stainless are given in Table 2. Increased speeds above that given are usually permissible where carbide tooling can be employed in a sat-

isfactory manner.

Those analyses identified as the non-free cutting stainless are also used for machining purposes since there are applications where a free cutting grade is not a permissible material. However, no difficulty should be experienced provided one understands the characteristics of these materials and observes recommended cutting speeds and feeds. In addition, judicious choice of tool material, tool angles and a copious flow of an efficient cooling medium are essential.

At this time it may be well to mention the machining characteristics of the new precipitation hardening stainless alloys. These materials are within the austenitic group having a corrosion resistance very similar to this alloy group, but also the ability to respond to a heat treatment. Thus, these alloys are very similar to many precipitation hardening alloys in that they can be both solution heat treated and aged.

Alloy 17-7 PH, a typical analysis, would be 0.07 per cent carbon, 17.0 per cent chromium, 7.0 per cent nickel, and 1.10 per cent aluminum and machines very similar to types 302 and 304 when in the annealed condition. Alloy 17-4 PH, a typical analysis, would consist of 0.04 per cent carbon, 16.50 per cent chromium, 3.50 per cent nickel, and 3.50 per cent copper and has the advantage in that it can be machined to final size in the solution treated condition, the Rockwell C hardness of the material ranging from 30 to 35. Thus, machining can be performed without allowances for the subsequent scaling and distortion since the aging or hardening treatment which

Type No.	TURNING		DRILLING		TAPPING		MILLING		REAMING	
	SFM (Low & High)	Approx. Feed Inches	SFM (Low & High)	Approx.* Feed Inches	SFM (Low & High)	SFM (Low & High)	SFM (Low & High)	SFM (Low & High)	Feed per Rev. 1/4" to 1" Reamers	
410	80/115	0.003	35/75	0.003	10/25	70/105	20/60	0.003		
420	40/80		30/60		10/20	35/70	20/60			
420F	80/110	to	70/90	to	15/25	70/100	30/100	to		
440	40/60		20/40		5/15	35/80	20/60			
440F	70/90	0.008	50/70	0.008	10/20	65/80	30/90	0.008		
443	80/110		44/85		15/25	70/110	20/60			
302	40/85		35/75		10/20	35/65	20/60			
416	110/140		70/110		15/35	100/125	30/120			
430	85/115		35/75		10/20	70/105	20/60			
430F	120/150		70/115		15/40	110/135	30/120			
329	60/80		20/40		5/15	55/70	20/60			
303	85/120		35/85		15/30	75/110	30/100			

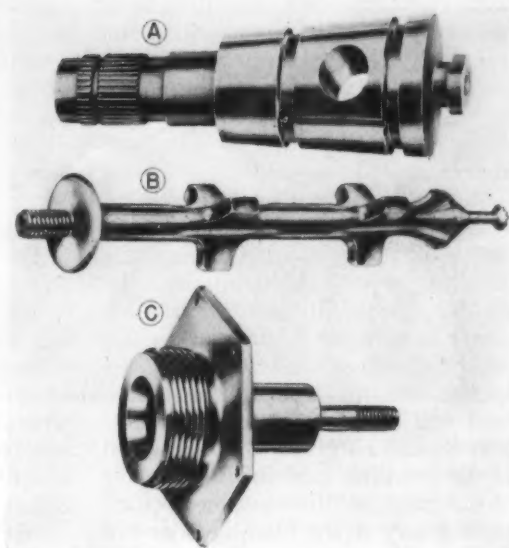
* On drills 1/4" to 1/2" diameter.

Acme Threads	THREADING			BROACHING			Nearest Comparable Equivalent in Ordinary Steels
	Nat'l Fine Threads	Nat'l Coarse or Tapered Pipe	General	Cutting Speed per Minute (Low & High)	Approx. cut per tooth Rd. Broaches		
12	10/20	18	10/20	10/20	0.001	SAE 3140, 4140, 6140, etc.	
12	10/20	18	10/20	8/15		SAE 1095, 3150, 3312, 6150	
12	10/20/25	18	12/25	10/20	to	SAE 2315, 2340, 2345	
12	10/20	18	10/20	8/12		High Speed Tool Steel	
12	10/20/25	18	12/25	8/15	0.005	SAE 1060, 1070, 1095	
12	10/20	18	10/20	10/20		SAE 3145, 3250, 4650, 6150, etc.	
12	10/20	18	10/20	8/15	In.	Cu-Ni alloys except work harden	
12	10/20/25	18	10/20	15/25		SAE 1030, 1120, X1340	
12	10/20	18	10/20	10/20		SAE 3140, 4140, 6140, etc.	
12	10/20/25	18	12/25	15/25		SAE 1030, 1120, X1340	
12	10/20	18	10/20	8/12		Copper-Nickel alloys	
12	10/20/25	18	12/25	10/20		SAE 3120, 3145, 4615	

Note: Average speeds and feeds given vary with job. In threading, the wide range due to chaser design and material. Slightly harder material will thread easier (210/240 Brinell) than dead soft material. In reaming, higher speeds are generally used for sizing work and the lower speeds for smooth finishes.

Note: All recommendations are based on the use of standard high speed tools.

Fig. 1—The ability to shape stainless to intricate designs is aptly shown in this illustration: (A) plug gage cock, made from type 416; (B) valve needle, made from type 303; and (C) plunger seat, made from type 416. Illustration courtesy the Carpenter Steel Company.



normally follows is performed at a relatively low temperature. This material, when in the annealed condition, is machinable at speeds comparable to that experienced with type 410 stainless; in this condition, the material type has a Brinell hardness between 280 and 320. Alloy 17-4 PH can also be machined while in the hardened conditions; in this condition, the material type may have a Rockwell hardness as high as C45. However, machining speeds must be reduced to approximately 40 per cent less than that listed for type 410.

Although the machinability of the stainless steels is mainly influenced by both the chemical composition and the structure, consideration should be given to the effect of cold working, as exemplified by the cold drawing operation as performed on bar stock. Thus, an interesting study on the machining qualities of the various standard stainless steels has been made on bar stock that was in both the annealed and the cold drawn condition. Results of this test have indicated that cold drawing will raise the speed values permissible for a given material as compared to the same analysis in the annealed condition, the only exception being

the high carbon high chromium martensitic stainless and the reason for this being already stated.

Regardless of either equipment type or type stainless to be machined, a variety of shapes and sizes can be produced with excellent surface finish, accuracy and fairly good tool life, provided that the characteristics of these materials are known and respected. Thus, the procedures as outlined are fundamental and applicable, with obvious reservations, to all the compositions. Also, the recommended procedures as given will be tempered by experience, changes in speeds, feeds or tool angles usually being necessary to conform to the individual conditions that are encountered from job to job. The ability to shape stainless to intricate designs is aptly illustrated in Fig. 1 by the plug gage cock, A, which is made from type 416; the valve needle, B, which is

made from type 303; and the plunger seat, C, which is made from type 416. The production of small precision parts, which is illustrated in Fig. 2, can be obtained in automatic equipment with an excellent surface finish.

Equipment and Tool Materials

The stainless steels are high strength materials, this fact precluding the use of rigid equipment. In addition, since it requires greater power to perform cutting operations on the stainless steels as compared to the carbon steels, the machine load will be high. Thus, consideration should be given to the relation of the machine load to the capacity of the machine, the equipment being satisfactory if the loading does not exceed 75 per cent of the capacity of the equipment. The stainless steels, as a complete group, also have high frictional properties which are accompanied by a low heat conductivity, resulting in a generation of heat greater than that experienced in the machining of other materials. This fact necessitates the use of an efficient coolant which will work equally well as a lubricant. In addition, in some instances, tool design must be altered so that this factor may be used to aid in heat dissipation.

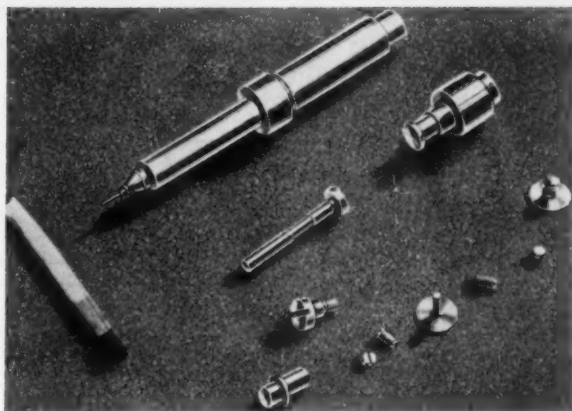
Where short production runs are anticipated, the turret lathe, either the hand screw or the heavy duty type, can be used to advantage on bar stock, castings or forgings. This type of equipment is characterized by its comparative rapidity for set-up, the ability to use standard tool designs, and the successful utilization of carbide tooling. Where high production rates are anticipated, the

automatic screw machine is a popular equipment type. Within this category, typical type machines would include the single spindle Brown & Sharpe automatic, the Swiss type of automatic, and the heavy duty multiple spindle automatic as exemplified by the New Britain Gridley.

The single spindle automatic screw machine, the tooling of which will be discussed in detail, is characterized by high spindle speeds and relatively light feeds. The Swiss automatic is employed on applications where high accuracy is essential, this equipment type being especially adapted for long slender parts with either tapers or shoulders. Tolerances can be held to 0.0003 inch on the diameter and to 0.0005 inch on a shoulder. Excellent results can be obtained with carbide tooling. Some variations in the diameter of stock from bar to bar are permissible, but "out-of-roundness" of the stock should be held to a minimum on close tolerance work since this condition can be easily reproduced on the part machined. Collets should run true to within 0.001 inch, highly polished carbide bushings being recommended. The multiple spindle machine is characterized by its rugged construction, thus permitting medium to heavy cuts.

Tool material selection is usually on the basis of the equipment type, the machining operation involved, and the capacity of the equipment; suggested tool materials in accordance to operations are given in Table 3. Within the high speed analyses type, the toughness of the tool material will vary, the group identified as Type 1, that includes molybdenum

Fig. 2 — On small precision screw machine parts, such as illustrated herewith, the free-machining stainless provides excellent surface finishes.



and tungsten types of high speed steels, being the toughest material. The high speed cobalt ranks second in toughness, whereas the high cobalt ranks third in this specific property. However, in

these materials, the property of red hardness usually increases as the toughness decreases, and thus a corresponding increase of machine speed can be realized.

Both the cast alloys and the carbides are specialty tool materials whose high red hardness characteristics make it permissible to employ relatively higher speeds than that used in high speed tooling. This type of tooling affords excellent results where vibration due to overloading may be experienced, due to its greater resistance to chipping or cutting-edge breakdown. However, the choice of these tool materials must be based on equipment that is in good condition and the use of heavy, rigid types of tool supporting devices.

The sintered carbides are frequently used as tool materials; however, choice of type carbide along with tool design for any specific job should be in accordance to the recommendations as given by a reputable carbide manufacturer. These materials, either the titanium, tungsten or tantalum carbides with vary-

ing percentages of cobalt, have excellent cutting ability due to their high red hardness; however, in general, their toughness is low in comparison to the other materials that have been discussed.

Although the choice of carbide is governed by the material type and its hardness and strength characteristics, one determining factor would be the equipment type. Thus, a new, high speed, powerful and rigid machine will permit the use of a harder, more wear resistant grade. Also, automatic and semi-automatic equipment on which several tools are simultaneously engaged on the same workpiece will require harder, more wear resistant carbide grades than either engine or turret lathes due to the higher speeds and finer feeds that are customarily employed.

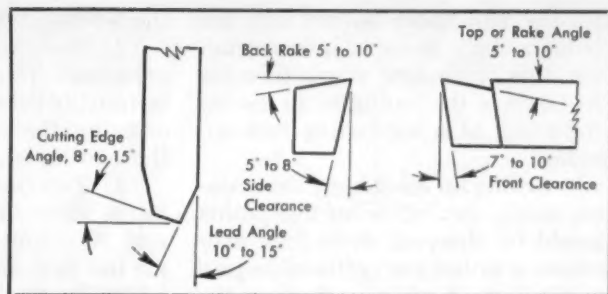
In the selection of a carbide grade for either a martensitic or a ferritic stainless, it can be stated that the selection would be on the basis of both the hardness of the carbide and the degree of crater resistance that is required. However, in some applications, a compromise between the two

TOOLS AND OPERATING CONDITIONS

	Type 1 High-Speed Steel	Type 2 High-Speed Cobalt	Type 3 High Cobalt	Type 4 Cast Alloys	Type 5 Carbides
Taps, Threading Dies, and Chasers Moderate or slow speeds, increase speeds for fine pitch threads.	Excellent	....	....	....	....
Cut-off Tools. Circular or blade type For average set-ups—medium or heavy feed, intermittent or heavy cutting at moderate speeds.	Excellent	Good	Good	Fair	....
Cut-off Tools. Circular, blade or insert type For special set-ups, employ medium or fine feeds at high speeds.	....	Good	Excellent	Excellent	Good
Form Tools. Circular, dovetail or flat For average set-ups—roughing or finishing cuts, use heavy or light feeds at moderate speeds.	Excellent	Good	Good	Good	....
Form Tools. Circular, dovetail or flat For special set-ups—finishing cuts at medium or fine feeds—at high speeds.	....	Good	Good	Excellent	Excellent
Box Tools Average set-ups—medium or heavy feeds and cuts at moderate speeds or intermittent cuts on Hexagonal Stock.	Excellent	Excellent	Excellent	Good	....
Box Tools Special set-ups—medium or light feeds and cuts at high speeds.	....	Good	Good	Good	Excellent
Low Speed Turning For heavy feeds and cuts at moderate to slow speeds or intermittent cuts.	Excellent	Excellent	Good	Fair	....
High Speed Turning (Rigid set-up with ample tool support) For medium and heavy cuts at moderate feeds and high speeds.	....	Good	Good	Excellent	Excellent
Finish Turning Very light depths of cut at fine feeds—for obtaining a fine finish.	....	Fair	Good	Good	Excellent
Reamers For average set-ups—medium to fine feeds—moderate speeds.	Excellent	Excellent	Excellent	....	....
Special Reamers For special set-ups—medium to fine feeds at high speeds.	....	....	....	Good	Excellent
Drills For average drilling conditions—medium to coarse feeds and moderate speeds.	Excellent	Good	....	....	....
Special Drills For special applications—deep holes, etc.—use medium to fine feeds at moderate speeds.	Good	Excellent	....	....	Excellent (Rifle Drills)
Shave and Skive Tools (For sizing) For finishing operations use fine feeds and cuts—moderate to high speeds.	....	....	Good	Good	Excellent
Milling Cutting For average cutting conditions.	Excellent	....	....	....	....

Table 3—Suggested tool materials in accordance to operations are given in this table, which is offered as a guide and should be used with reservation since type of equipment, special tool grinds, and in individual efforts of machine operators and setup men will vary.

Fig. 3—Recommend angles for grinding single-point turning tools are given in this sketch.



stated factors or hardness and crater resistance must be made. In general, the problem of cratering is not as troublesome in the austenitic alloy types, the property of wear resistance being of greater importance.

Operational Procedures

The Turning Operation. The Brown & Sharpe automatic screw machine, which is frequently employed in the machining of small stainless component parts at L. F. & C., uses a variety of tool types for external forming operations. Thus, the balanced turning tool, the adjustable hollow mill, the plain hollow mill, box tools, swing tools and knee tools are employed in the turret position. The circular form tool and the circular cut-off tool are used in the slide position, the latter tool being employed for parting the finished machine piece from the bar length held in the spindle of the machine.

Although detailed discussion on these tool types will not be given, it can be stated that the balanced turning tool is preferred for straight rough turning with both the plain and adjustable hollow mills, roughing style, ranking next in preference. For straight finishing, turning box tools are preferred; however, the adjustable hollow mill, finishing style, is at times employed. The knee tool

is intended only for turning scale on black stock.

Both the plain and adjustable hollow mills have the advantage in the turning of long, slender shafts of small diameter due to the support that each can offer in permitting the machined stock to pass through the hole, which extends through the center of the tool. One disadvantage of the plain hollow mill, as compared to the other turning tool designs which have adjustable cutting blades, is that it is applicable only to a single stock size. Thus, in this tool design, the three teeth permit a balanced cutting; however, it is essential to check such figures as alignment and clearances to determine whether this tool is cutting to the proper diameter.

The knee tool, often used for roughing work on heavy sections in the multi-spindle machine, usually requires less clearance than either the box or the balanced turning tool. This tool type is also used on the single spindle machine on short, stiff work for either roughing operations or in preparing the piece for subsequent circular forming operations. It must be remembered that the turning tool types such as the balanced turning tool

and the adjustable hollow mill are comparatively massive in construction, this precluding ample time for clearance of the tool prior to the introduction of a succeeding tool operation.

In tooling for machining the stainless steels, the following five points should be observed since they may influence either the permissible production speed of operation or the finish of the part. Thus:

(1) Due to the lower heat conductivity of the stainless grades, it is suggested that as large a tool as possible be selected. Thus, the life of the cutting edge is dependent upon good heat dissipation into the body of this tool, as well as into both

the workpiece and the cutting fluid.

(2) The minimum front clearance angle of a turning tool should be roughly between 7 and 10 degrees, assuring the maximum support of the cutting edge.

(3) Top rake angles should be fairly steep; a value of between 5 and 10 degrees will tend to generate less heat and be freer cutting. In addition, generous chip curlers or chip breakers will also prove to be a decided advantage.

(4) Where close tolerance work is to be performed, the use of finishing cuts is suggested. If the work cuts to a taper, turning to within 0.003/0.005 inch of the finished size is recommended, followed by a light finishing cut taken at a fairly high speed.

(5) In regard to a cutting fluid, the cooling properties of this fluid are usually of more importance than its lubricating properties, particularly in obtaining excellent surface finishes utilizing light finishing cuts.

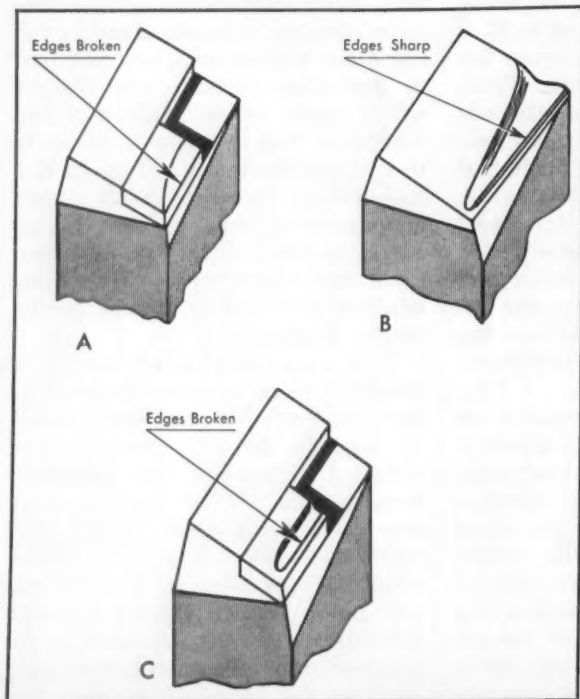
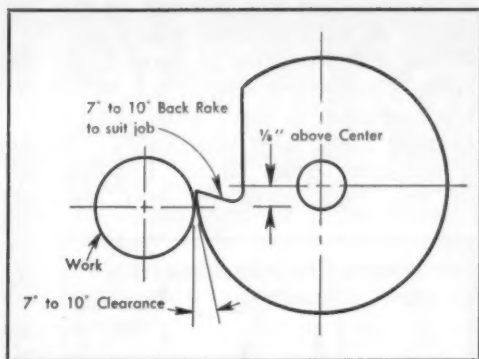


Fig. 4 — This sketch shows various chip curler designs: (A) Chip-breaker grind for carbide box tool. This grind may also be produced in all other types of tool compositions. (B) Chip-curler groove as usually applied to high speed cobalt type tools. (C) Chip-curler in carbides should be modified by breaking cutting edge with hand hone.

Fig. 5—Recommended angles for grinding circular cut-off tools are given in this sketch.



The recommended angles given for single point turning tools are illustrated in Fig. 3, a slight nose angle on the tool being preferred. Where carbide tooling is to be employed, the life of the cutting edge will be extended if the sharp cutting edge is broken with a hand hone. As mentioned previously, the use of chip curlers is suggested in machining the non-free cutting grades where difficulty may be experienced by the long, stringy chips which may pile up on the tool and clog the work. Thus, in addition to controlling the long chips, a properly ground chip curler will produce a lifting effect on the chip so that there is less friction on the cutting edge of the tool.

The chip curler design for medium to light cuts, as illustrated at A in Fig. 4, has been suggested particularly for carbide tool materials; however, it may also be employed for other tool composition types. For heavy cuts, particularly with the austenitic chromium-nickel grades, a chip curler grind as indicated in either B or C in Fig. 4 is employed, the former mentioned design being applicable to the high speed cobalt type tools. In either case, the groove should not break through the front edge of the tool; otherwise a marred, torn surface may result.

The use of a chip curler is also recommended for the free cutting

grades of stainless; however, in this instance, the chip curler design need not be as deep. As a general rule, both the width and the depth of the chip curler will be determined by both the depth of cut and the feed that is employed; the heavier the cut, the deeper the curler will have to be to properly break the chip.

Forming and Cutting-Off Tools. The forming tool, which is operated by the cross slides on the automatic screw machine, shapes either part or the entire contour of the body. The circular form tool is used extensively in the single spindle automatic, whereas the dovetail tool is employed in the multiple spindle machine. In the circular form tool, the periphery is formed to cut the required shape and a deep notch is ground in this periphery to give a cutting edge. In design, this tool type is very similar to the circular cut-off tool, illustrated in Fig. 5, and the tool angles given apply.

One of the limiting features of the circular forming tool is that the maximum limit of form length for the stainless is approximately $1\frac{1}{2}$ times the diameter of stock; forming lengths beyond this limit may result

in chatter, poor tool life and an inability to hold to close tolerances. Where it is necessary to shape a relatively large form length, the forming operation is split between two forming tools, each operating from a separate cross slide. Blending of the two cuts is then re-

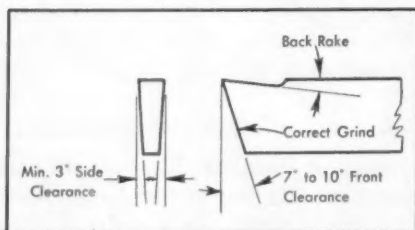


Fig. 6—This sketch gives recommended angles for grinding a standard bevel cut-off blade.

quired, the most likely place being on a shoulder where a slight ridge may not be too noticeable.

The side clearance on form tools will vary from 3 to 5 degrees, this factor being of considerable importance for deep forming cuts to prevent both galling and seizing and to increase tool life. Due to the clearance employed, there may be excess metal, this often being removed by a subsequent operation known as shaving. Where rough forming tools are employed, it has also been suggested that all sharp corners be ground with a slight chamfer. In this case, either a finish forming tool or a shave tool, operating at fine feeds, may be used to finish the part to size.

Cut-off tools can be of either a circular form type just described or a flat blade, the function of this tool being for severing the completed part from the bar of stock. Both tools must be ground with top rake

and front clearance, as indicated in Figs. 5 and 6. Since cut-off tools are fed frequently into drilled holes or holes that may be threaded, the circular cut-off tool will be more rigid and will withstand proportionally greater shock than the flat blade type. As in the forming operation, side clearances are essential, the value of which will depend on the depth of cut.

Drilling Operations. Since drilling with automatic equipment differs from hand drilling, where faulty technique can be determined almost immediately, the following factors become of greater importance: (a) the work must be kept clean; (b) the drills must be carefully selected and correctly ground; (c) tools must be properly aligned and the work firmly supported; (d) the stream of lubricant must be properly directed; and (e) the depth of hole to be drilled will control the number of bites that is required.

In automatic screw machine work, a centering drill precedes actual drilling operations, the purpose of which is to provide a true center line. In centering for hand drilling, a three cornered punch is employed, this being especially true with the work-hardening austenitic grades. To relieve chip packing and congestion, drills must be occasionally "backed out." Thus, the first drill will extend to a depth of 3 to 4 times the drill diameter; the second drill entry will be approximately 1 to 2 times the drill diameter; and each succeeding drill entry will be approximately $\frac{3}{4}$ to 1 times the drill diameter.

The standard drill that is employed would contain a heavy web and

a short spiral, the included angle usually being 140 degrees. The "cutter pin drill" is usually used to drill small "cross holes" in the heads of bolts, screws, pins, and so on, is heavily constructed to withstand abnormal strains and a shorter helix angle of the flutes to aid chip control. Whenever possible, chuck drills for the shortest drilling length to prevent whipping of drill and subsequent breakage and inaccuracy of work. Where this cannot be done, it is recommended that the "crankshaft" drill, having a very heavy web and a high helix angle, be employed.

Fixture grinding of drills is recommended. The lip clearance should be between 9 and 15 degrees and the two cutting edges must be of equal length and angle. This latter factor is of importance since an unbalanced cut may cause chatter and also produce an unsatisfactory hole due to crowding of the drill to one side. Too much clearance will cause the cutting lip to either chip or break due to insufficient support. Conversely, too little chip clearance will require heavy pressures to feed into the stock. This latter mentioned difficulty may also be caused by too heavy a web, often minimized by point thinning. However, this point thinning must be done equally on both sides of the web.

A generous supply of coolant should be directed into the drilled hole to adequately wash away the chips. In the drilling of the austenitic stainless grades, a steady pressure in drilling will prevent riding and subsequent glazing and hardening of the work. When backing out to relieve chip congestion, the drill

should be carefully inserted near the bottom of the hole before starting with a positive feed. At this time, it may be well to mention the use of a floating holder which is used extensively for holding drills, reamers, counterbores, and similar tools in the turret positions of the Brown & Sharpe single spindle automatics. This type of holder will assure greater accuracy in performing these operations.

(To be continued in the next issue)

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.



Small Shop- Big Business

By GILBERT C. CLOSE

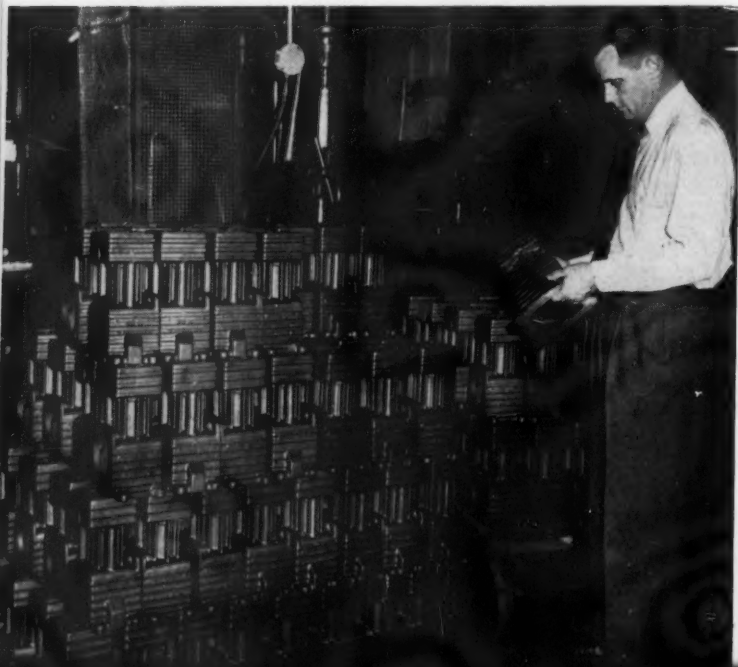
A verbal blueprint of the successful, steady progress of a small shop producing portable spray painting equipment and doing a volume business.

SOMETIMES an industrial writer is momentarily nonplussed by the serenity that cloaks operations in an apparently successful manufacturing plant. Things are running so smoothly that there's no excitement, just steady progress. So what is there to write about? Then suddenly it dawns upon the writer that in this serenity lies the best of stories; that it actually personifies the

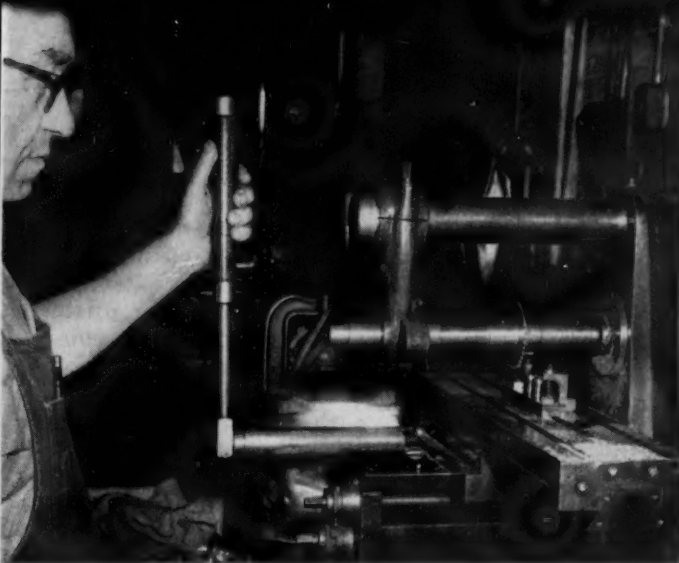
goal of every industrial concern—assurance and success. It then becomes quite evident that a verbal blueprint of how this goal was achieved will be of interest to everyone seeking the same results.

This was the situation at the Sharpe Manufacturing Company, Los Angeles, the only west coast producer of a nationally distributed line of portable spray painting equip-

ment. During a visit to the plant, the writer observed that not one of the 30 employees seemed in a hurry; yet each apparently knew just what to do. The less than 4,000 square feet of shop space was not crowded and piled with work; yet



▲
Kenneth Sharpe inspects compressor castings as they arrive from the foundry.



Milling a slot in a spray gun attachment. Tolerances are held to within 0.0002 inch.


proportions compete in a national market for a conventional product with other firms six, ten and a dozen times its size?

Kenneth B. Sharpe himself, acting general sales manager, provided the

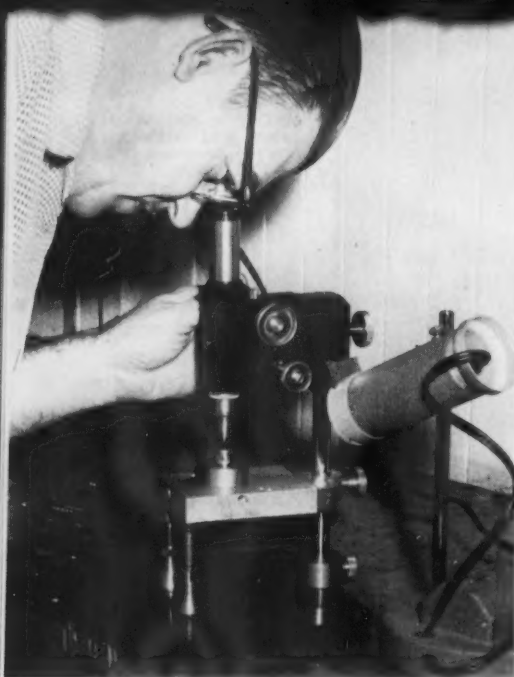
there was ample evidence that every square inch of it was being used. The stockrooms were not large, but were full.

There are no extended assembly lines at Sharpe, but spray painting equipment is taking form everywhere you look. When it reaches the stockroom level, it is painted, powered, tagged, tested, and ready to go. But a question still persists despite this evident production efficiency: How can a concern of such compact

clues to the answer. "Activities within our own shop are largely confined to finishing operations on sub-contracted components. Our job is to build in the necessary quality, and we concentrate on this one aspect of production. Furthermore, by careful engineering, we have conso-



Machining a spray nozzle cone with a dial gage micrometer in constant contact with the work. Concentricity of the cone must be within 0.0002 inch.



Checking spray cone concentricity with a micrometer microscope.

literated and simplified our product line until the components of our equipment are largely interchangeable. This interchangeability has two advantages — a production advantage in that we can concentrate on mass producing fewer different precision components, and a sales advantage in that the customer likes and is benefited by the simplicity and interchangeability we have designed into our spray painting equip-

▲

Spray gun head assembly. Each unit is fully assembled by one man to assure highest quality.

ment. Another customer advantage derives from the fact that it is less costly to produce, distribute and handle the interchangeable units than it would be if each unit required its own line of parts."

To amplify his words, Mr. Sharpe pointed out that currently only one spray gun handle and two spray gun heads are being produced. "These components, used interchangeably, give us four models, as each head can be used for either syphon or pressure spraying. During the early part of our 28 years in business, we produced a wide variety of equipment. This meant that the total number of each component required was relatively small, and these short-run parts had to be produced on lathes. Now, with the interchangeability of parts stepping up the number of parts required in each production



Testing a spray pattern. Each gun is tested in this manner, using conventional production painting materials.

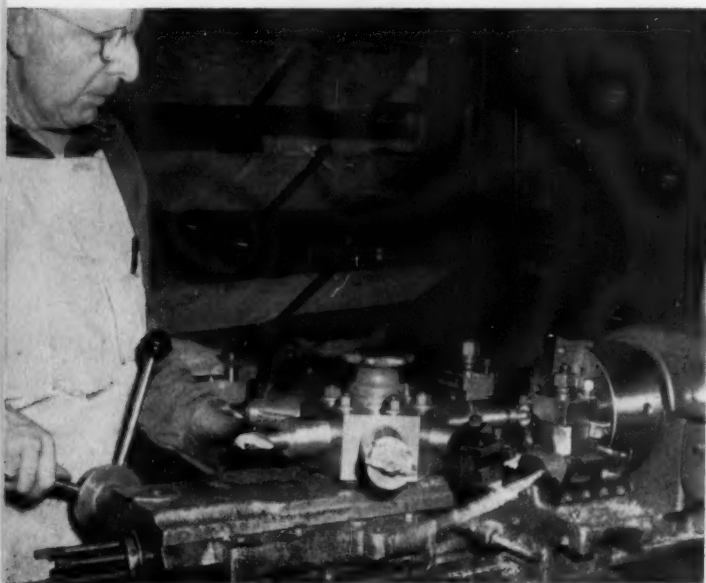
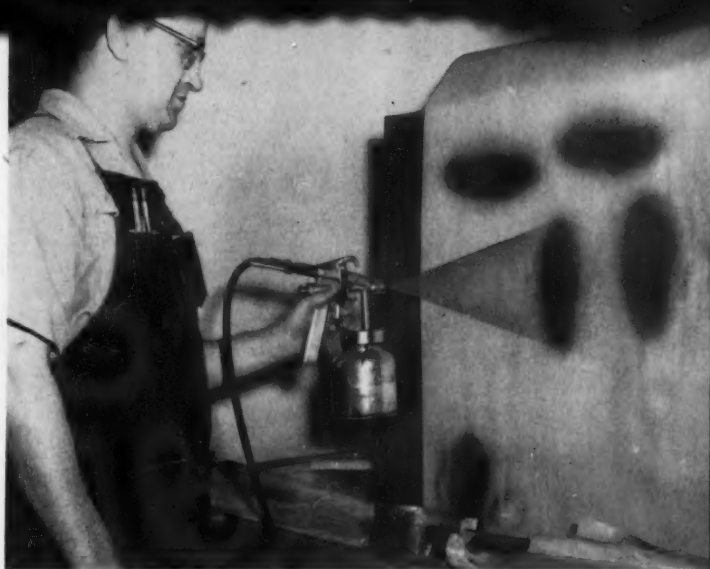
run, they can be produced on automatic screw machines. This one factor served to skyrocket our production without additional space requirements.

"Then, as our market expanded, we began to sublet more and more of our rough work, and concentrated our own work on quality precision finishing operations. Our men are trained to meet specific precision standards and will accept no less; the same standards exist in the production testing of our prod-

ucts. Thus, we can feel sure that every spray gun with its accompanying equipment that leaves our plant will not only confirm but bolster our sales literature and claims.

"Another way in which we have managed to step up production without additional space and facilities is

by keeping a 'weather eye' on industrial process improvements and then adopting them as soon as they are developed sufficiently to meet our



"Hogging" a winged air cap on a turret lathe. This rather tedious operation is being eliminated in favor of shell molding of the air cap to precise dimensions.



Final assembly of a portable spray painting unit. Here again the same man "follows through" on the work to assure utmost quality.

and will release some of our limited shop space for other work."

The personnel policy at Sharpe Manufacturing Company is carefully designed to fulfill the require-

ments. As an example of this, in the production of winged air caps for our spray gun nozzles, we have been 'hogging' them out of rough castings for a number of years. Now we find that the new process of shell molding will produce 'as cast' caps that meet our tolerance requirements, so we are swinging over to this process. This will save many tedious hours of lathe 'hogging' work

ments of a small company doing a big business. Here again Kenneth Sharpe explains the logic used to



Stockrooms are small, but well filled.

A salesman demonstrates the Sharpe line in the company's own sales office.

meet the situation. "Because of our relatively small staff and the high precision standards maintained in our work, a large percentage of our employees must be highly skilled technicians. As might be expected, we have to expend time, effort and money to obtain such men. But once we get them, we continue to expend time, effort and money to keep them on the payroll. As a result of this policy, many of our shop employees have been with us for years, know their jobs thoroughly, and are entirely capable and willing to maintain our high precision requirements."

The personnel policy at Sharpe extends beyond the shop level. The engineering "department," for instance, is a one-man institution.



However, when this man started to work for the company several years ago, he brought with him 17 years of intensive spray painting equipment design and development experience. Today this tremendous backlog of experience is brought to bear on every improvement that goes into the Sharpe line. This "one man" department was entirely responsible for the new Sharpe spray gun which embodies the latest design coupled with extreme versatility and which produces one of the finest spray patterns that can be achieved.

It is quite evident from the foregoing that the Sharpe Manufacturing Company's success in doing a big business from a small shop cannot be traced to any one practice. Rather, a carefully blended combi-

Kenneth Sharpe demonstrates the single handle and two heads used interchangeably to make up four different spray gun models. Each type head may be used for syphon or pressure type spray painting.



nation of practices are used, each contributing to the net results.

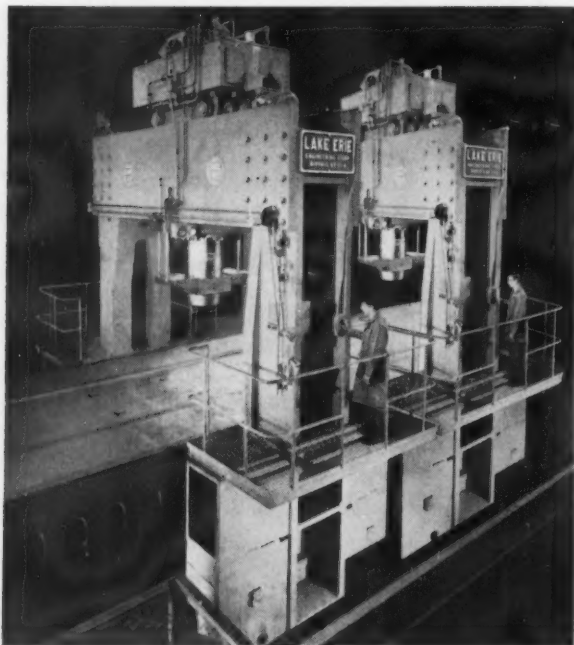
First, a product is designed using only customer requirements and customer satisfaction as a guide. Secondly, the industrial scene is carefully studied for the best practices and processes available to produce the basic product components. Third, shop operations within the company are confined to building the required precision and product quality into these basic components. Every facility and practice within the shop are bent toward this goal. Finally, each piece of spray painting equipment is so thoroughly checked and tested during and after assembly

that even the smallest defect in manufacture or operation is revealed and corrected before the equipment gets into the hands of the customer. As the old philosopher says, "This all adds up!"

Many of the illustrations included with this article emphasize the persistent striving toward perfection and precision in the Sharpe Manufacturing Company's shop.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.

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BUILT by the Lake Engineering Corp., Buffalo, N. Y., for one of the world's largest foundries, the press illustrated herewith is used to straighten castings measuring 22 x 10 ft. and weighing over 46,000 lb. The press is 40 ft. long overall, 23 ft. wide, 30 ft. high, and weighs over one million pounds. The bed is 12 ft. 4 in. wide x 36 ft. long and has a large well to permit the handling of large castings on edge. Four filler blocks along the center of the bed are removable to permit the straightening of large or deep parts. Each traveling head of the press has a 50 h.p. self-contained pumping unit and exerts 1,000 tons.



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Machining Stainless Steel

By G. J. STEVENS*

This case history illustrates and describes an effective setup for matching the end radius of a $\frac{3}{8}$ -in. o.d. Type 303 stainless steel part.

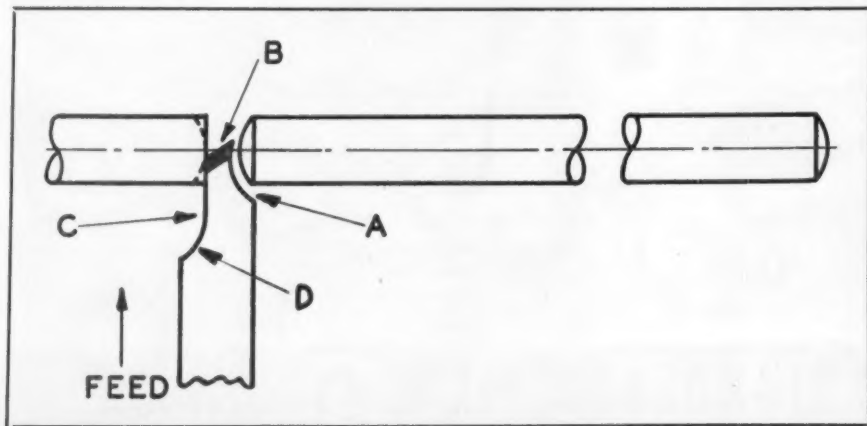
Problem: Matching the end radius of a $\frac{3}{8}$ -in. o.d. Type 303 stainless steel part machined in a small turret lathe with a combination form and cutoff tool.

Solution: First grind section A of the tool to the required radius, allowing the tip of the tool to extend beyond the radius as shown in the shaded area B. Then grind back the

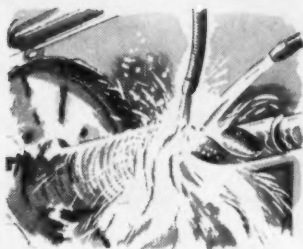
tip of the tool until the radius is correctly placed on the workpiece at the moment of break-off.

The radius of the stock in the collet can then be cut by the other side of the tool, as shown at D. However, allow enough idle approach at C to permit the finished piece to fall off before the tool starts cutting the second radius. The stop on the cross-slide is set to match the radius of the section A.

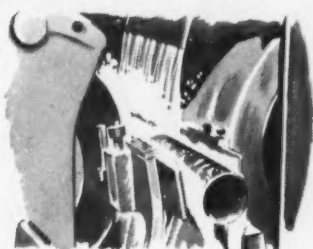
* Machining Engineer, Armco Steel Corp.



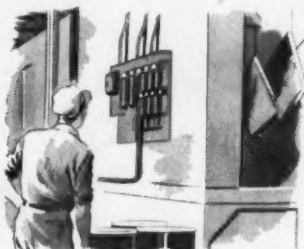
New S.E.C.O. is Tops For These Operations



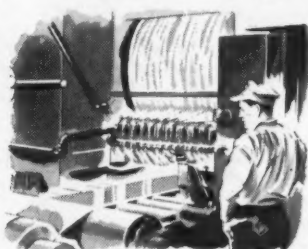
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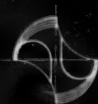
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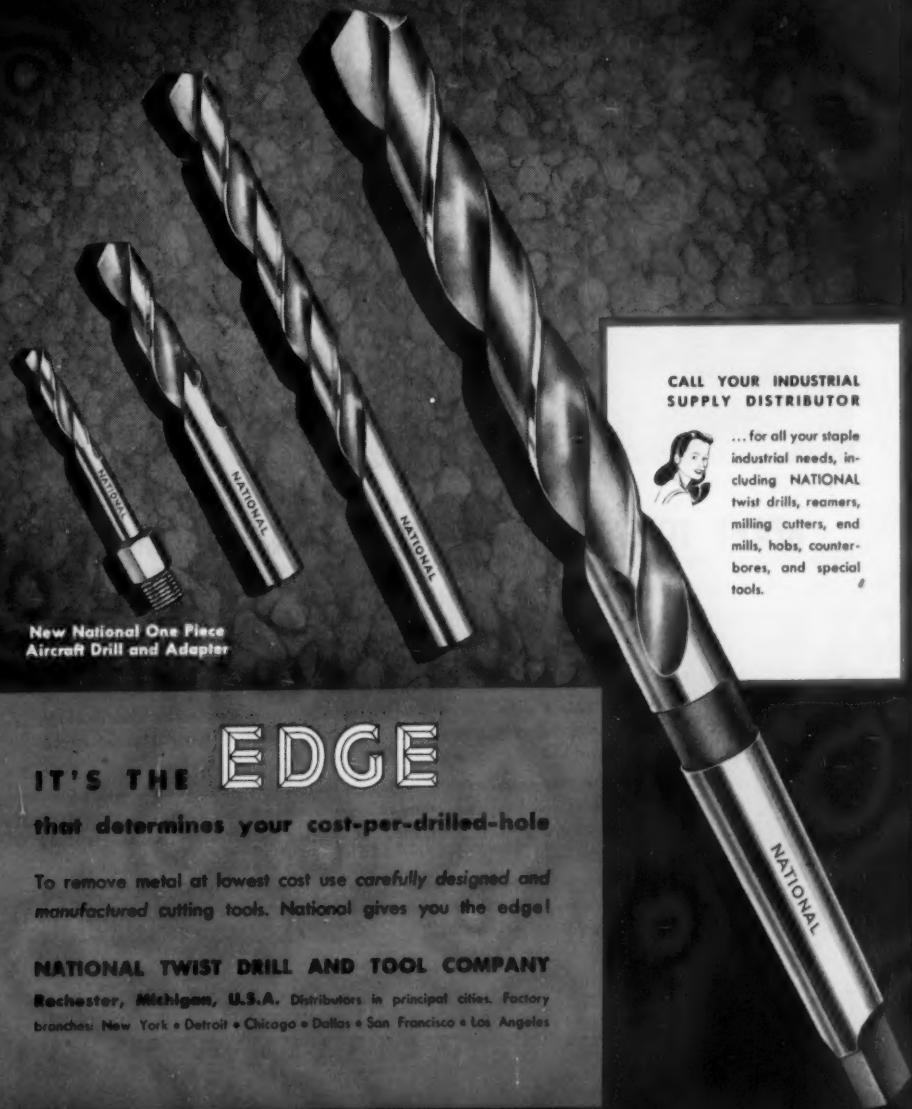
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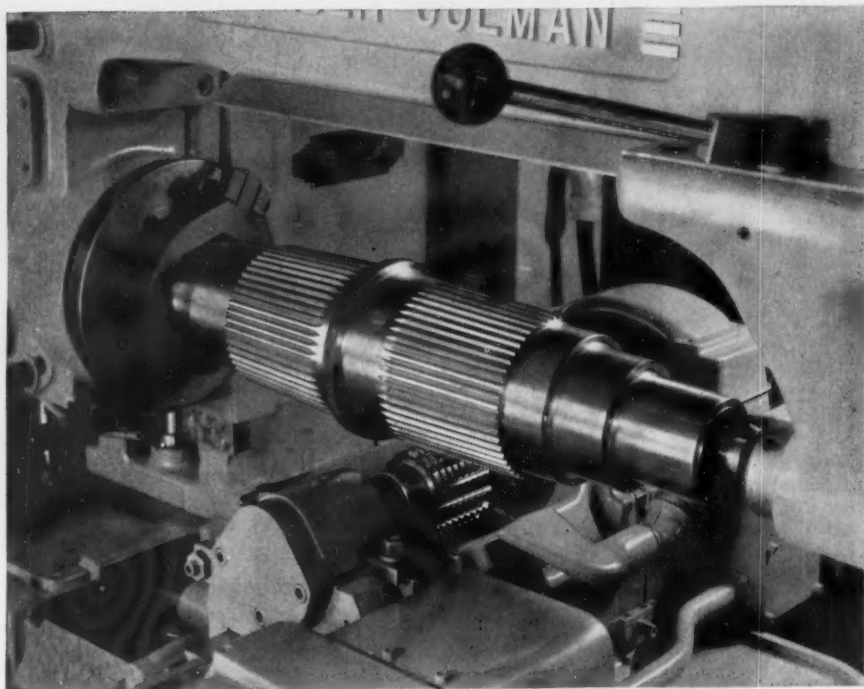
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HEAVY TORSIONAL DRIVE USES TAPERED SERRATIONS ***Hobbed On Specially Arranged Machines***

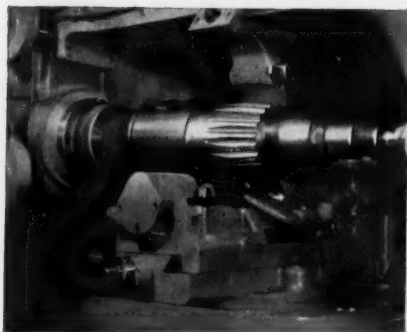
work slide and overarm swivel up to 5°

This Barber-Colman No. 16-16 Hobbing Machine is specially designed and arranged for hobbing tapered serrations. By swivelling the work slide up to 5° to obtain the desired cutting angle, several different tapers may be hobbed on the same machine. Once the proper set-up has been made, hobbing of tapered serrations proceeds according to standard hobbing technique.

Other than the special swivel arrangement on the work slide, universal joint on the worm shaft, and a cut-away outboard overarm support, this machine is of standard design and illustrates the practicability of adapting special work to standard hobbing techniques.

When not in use hobbing tapered serrations, this machine can be used for standard spur or helical gear work and straight splines. It is equipped with an Automatic Hob Shifter for maximum hob life.

B U I L D E R S O F P R E C I S I O N G E A R



metal-to-metal fit, wear compensation

Tapered serrations provide one of the best holding means for drives which have heavy and frequently-reversing torsional loads. The metal-to-metal side bearing fit eliminates relative rotation between members, and the taper provides for take-up to compensate for wear. Typical applications are heavy reversible drives such as tractor axles and hubs, and high-frequency reversible drives such as steering shafts and Pitman arms.

involute tapered serrations

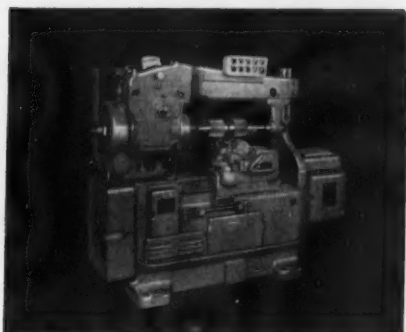
Both involute and straight-sided tapered serrations may be produced by this hobbing method. The major illustration shows the hobbing of 10/20 diametral pitch involute serrations, $\frac{3}{4}$ " taper per foot O.D., 54 teeth, and 6" major diameter. These teeth have a generated form with tapered root and outside diameter, the form changing continuously from the large to the small end. The mating part is swaged slightly undersize and the desired contact is obtained as a result of cold working the material in fitting the members. The swage is usually hobbled by the same set-up as the tapered shaft.

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straight-sided tapered serrations

The second illustration shows the hobbing of straight-sided serrations using a single-position hob. These teeth are hobbled in 2-cuts and have straight sides with constant-width tooth spaces which permits the mating part to be broached to size after reaming to the correct taper. The internal mating part is broached one tooth at a time, providing a metal-to-metal fit which is not dependent upon cold working the material. Should looseness occur due to wear, it is taken-up on the tapered sides of the teeth.

Barber-Colman Engineers developed the special single-position hob for producing tapered serrations with a constant space width. They welcome special applications where this type of drive is an advantage and will be glad to furnish estimates on both hobs and machines for economically producing tapered serrations. Just send prints or samples marked for the attention of our Hob Engineers.

H O B S A N D M A C H I N E S S I N C E 1 9 1 1



The author confines his discussion to suggestions for qualifying plant employees for promotion to supervisory ranks.

By ALFRED M. COOPER

IN ANY plant it may be reasonably assumed that the artisans who actually get out production are qualified for the jobs they hold, by virtue of training and experience. But in American industry, one out of every six or seven employees is chosen as a supervisor of some sort. And supervision is one trade for which there exists no formal apprenticeship school.

It is also true that the man who is selected as a straw boss, if he demonstrates ability in handling men, usually lands a foreman's job. Likewise, the record shows that most general foremen and superintendents once were foremen. It then becomes a matter of extreme importance, both to the company and to

the employees, that the right man be chosen as straw boss.

A lot of time and trouble can be saved if the man who may become foreman or works manager makes good on his first supervisory job. If he does not then make the grade as bossman there is an excellent chance that a good workman may thus be lost to the plant. Demoting a supervisor to the ranks is at best a sorry business, and it sometimes happens there is no logical place for that man to go but out.

In instances it has been assumed that the selection of a supervisor could be simplified to the point where the best workman in a department, in terms of quantity and quality of his production, automati-

cally qualified for promotion to a supervisory job. If promotion is to be considered as a reward for painstaking effort and efficient performance on the job, it may appear reasonable to allot supervisory jobs to the best workers. *And it is true that a man who excels in one line of work may have what it takes to succeed in another type of effort—or he may not.*

Success as a machinist calls for certain valuable characteristics, but it is not essential that this artisan be an expert in dealing with human relationships. Being a good foreman is a matter of daily solving scores of human-factor problems. This is why we sometimes see a top-notch worker promoted to a supervisory job and then later hear he has requested to be put back at his old work.

In the development engineering branch of a large Midwest factory, a department head was promoted. Management, perhaps with some misgiving, appointed a brilliant young scientist to succeed as chief of the department. Within three days that department was in a turmoil. The new supervisor was here, there, and everywhere. He wanted to know what everybody was doing, and why. His subordinates, a rather temperamental group of physicists, chemists and metallurgists, told him bluntly to go away and leave them and their work alone.

Then the division head called in the new supervisor and suggested that he humanize his relationships with those reporting to him. The scientist listened and at once set out to follow orders. He began slapping surprised subordinates on the back,

called Jim, Charlie, and Charlie, Joe, and remembered to ask after the health of their offspring. Most of these young Ph.D.'s were unmarried, but that didn't concern the new boss. He kept this up until matters reached a crisis. Something like a concerted uprising took place. Two weeks after being appointed, the supervisor went to his superior



"... a man who excels in one line of work
... may not have what it takes to succeed in
another ..."

and pleaded to be put back in his old nook in the laboratory.

To succeed this man, management selected a chemist who happened also to be a man who liked and understood people. He made good on the new job. A couple of years later he was made division head and eventually was appointed chief of the great development branch. In a speech to a group of scientists I later heard this man laughingly remark that he had forgotten all the chemistry he had ever known; that his duties as boss of 2000 scientists had very little to do with scientific matters. That is, he supervised the efforts of these men of science, encouraged them and motivated them, but left the intricacies of their profession to the experts.

In the foregoing example it would be nice if we could generalize by saying that the man who failed simply was not a natural-born leader, while the second man was particularly gifted in this respect. The trouble with this reasoning is that there probably is no such thing as a natural-born leader of men.

What we usually have in mind



"Ordinarily men of this type gravitate into political life . . ."

when we pin that label on a person is that combination of personal magnetism, plausibility, and perhaps ruthlessness, which has been known to persuade millions of people to follow self-seeking, egotistical men to destruction. *Ordinarily men of this type gravitate into political life; you do not frequently find such an individual holding supervisory ranks in industry.*

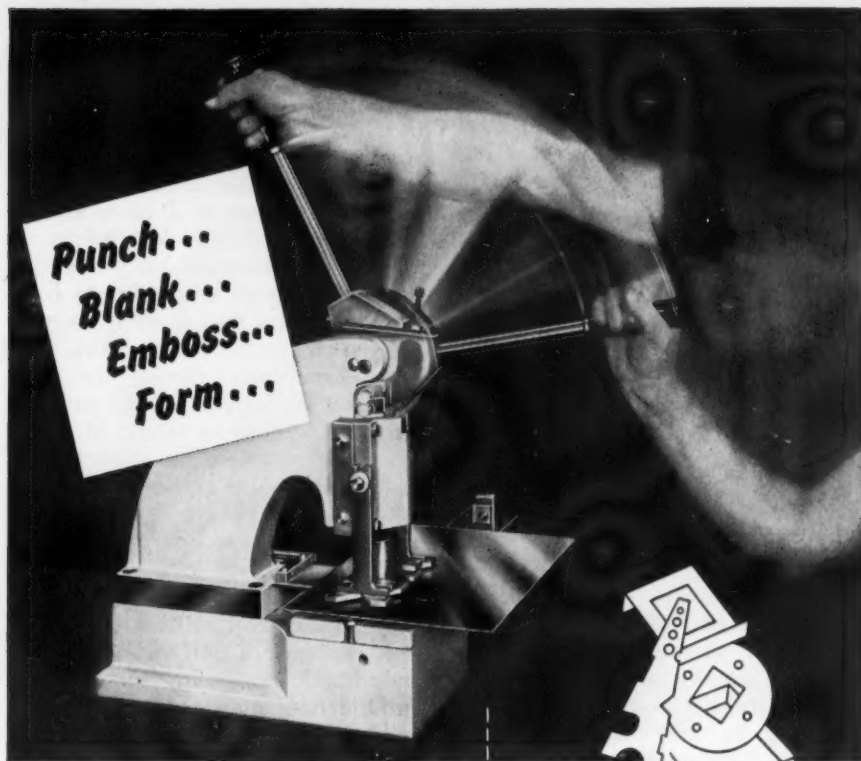
Fortunately, in American industry we have certain automatic safeguards that operate to protect those who might fall for the blandishments of false leadership. It is demonstrable that satisfactory morale can exist in any organization only when the quality of supervision is good; and morale and production go

hand in hand. Under private enterprise there is no place for the supervisor who cannot get out production and at the same time maintain good employee relationships. The "natural-born leader" appears to have difficulty in building lasting morale in his department.

Good leaders, and good industrial supervisors and executives, are made, not born. As often as not they are at least partially self-made. A newly created supervisor must quickly learn the rudiments of supervision, partly by trial-and-error and partly by emulation. If he is fortunate he will be permitted to sit in conferences in which older supervisors discuss methods of handling people. Thus, he can absorb ideas on this subject from those with more experience.

In discussing the essential qualities of leadership a group of seasoned executives can readily suggest 40 to 50 characteristics which they consider a leader of men might well possess. But when these division heads are asked to boil down this list to the qualities they would insist should be possessed by a new assistant of theirs, it is surprising how head men in widely divergent industries and localities find themselves in agreement regarding the indispensable qualifications for leadership.

After discussion, such an executive group will reduce the 40 or 50 characteristics down to the essential qualities of leadership, which, as a rule, will include intelligence, integrity, forcefulness, fairness, loyalty, kindness, knowledge of work, and health. Furthermore, when asked to assign to these essential attributes



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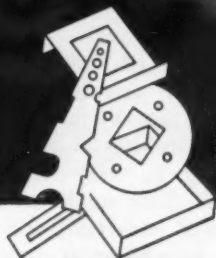
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an order of importance, the executives usually arrange the qualifications in about the order given above.



"... the essential qualities of leadership include intelligence, integrity, forcefulness, fairness ..."

In most of the attributes listed the newly created supervisor can improve himself by conscious effort. The natural-born leader may be outstanding in one, two, or possibly three of these qualities; the "made" leader of men can, and should, attain a nice balance among all of the necessary qualifications.

Of the eight essential ones, perhaps only intelligence may be considered to be primarily an inherent quality. We continue to gain in knowledge, but our capacity for growth in intelligence is probably determined at birth.

Intelligence almost always receives a No. 1 rating in this tabulation. It is not difficult to see why, when we observe the trouble a supervisor can cause by being just plain dumb. Intelligence is the quality that makes it possible for a man to do the right thing in a situation

he has never before encountered. It is an attribute that wins the respect of subordinates.

However, intelligence should not be over-rated as to importance. It is a fact that a man may be simply too smart to make a good supervisor. The one person I have known who rated within a few points of perfect on a standard I.Q. test could never have been successful at handling men and was never even considered for supervisory work. He was diabolically clever, too well aware of his superb mental powers, erratic, inclined to laugh at those who did not share his capacity for sustained mental effort, and he was wholly untrustworthy. *Psychologically he was a wonder; psychiatrically he was a mess.*

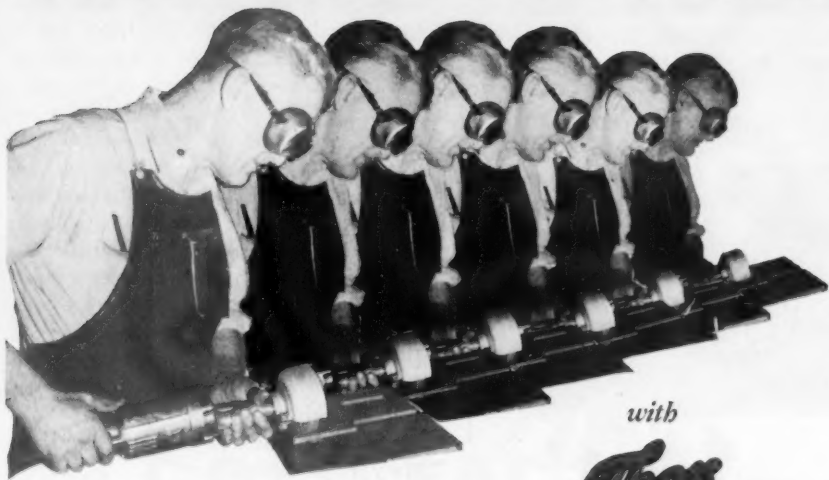
But when we consider the remaining seven qualities of leadership it is not difficult to see that any individual, possessing but average intelligence, may sharply upgrade himself in these other qualifications. Also, it has been found that anyone



"Psychologically he was a wonder; psychiatrically he was a mess."

can make a surprisingly fair and objective analysis of his own capacity for leadership. Providing only that the check is made privately, and the results are to be made

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known to no one but the analyzer, a man may determine for himself whether or not he rates highly in integrity, forcefulness, fairness, et cetera.

It is not too difficult for the individual to do something about correcting many of the deficiencies brought to light by such an analy-



"Management everywhere is looking for men who rate highly in . . . qualities of leadership."

sis. Thus, if a man knows his word to be good; if he knows he can be depended on to do what he believes to be the right thing, rather than the expedient thing; if he knows others may depend upon him when the going is tough—such a man has little to worry about when he rates himself on integrity. He's got it.

If his analysis proves that he does not rate highly in this attribute of leadership, then certainly he can do something about it. Indeed, only he can improve himself in this respect. And the same thing applies in the case of the six remaining essential qualifications of a good supervisor or executive.

Management everywhere is looking for men who rate highly in these eight qualities of leadership. It would be pretty hard nowadays for a man who so rated to avoid being offered a supervisory job. Somebody is going to ferret him out. Conversely, it is pretty hard for a man who rates low in these categories to get very far as a supervisor.

A carefully study of the above essential qualities of leadership, and a self-rating in these, cannot but be helpful to the newly created supervisor, or to those who would like to become supervisors. In addition, there is another, and perhaps more easily understood method, by which anyone can decide whether or not he has what it takes to make a good supervisor or executive. Simply, the individual may ask himself, "Do my fellow-workers like me and do they respect me?"

If this sounds like over-simplification it is nevertheless true that most employees who lose out on promotion to supervisory rank are deficient in the qualities that inspire liking or which command respect. The employee who is to be promoted must win both liking and respect, and a fair balance must be attained between the two.

Thus, a man may be the most likeable fellow in his department and never be considered for promotion. Or, he can possess the traditional attributes of a top-sergeant and thus win the grudging respect of everyone; but if he is not liked he will be passed up when new supervisors are being appointed.

In discussing liking as an essential for promotion, older executives point out there are two methods by



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which anyone may be assured of winning the liking of others. The first is for a man to go out of his way to do favors for others, whenever the occasion offers. The second is for him to encourage others to do favors for him. Apparently both of these methods are effective and are considered to be about equal in getting results.

I was inclined to underestimate the value of liking as an element in



"... my co-workers . . . were interested in helping me get further promotions."

securing promotion to executive rank until the general manager of a large Midwest corporation, in a moment of frankness, told me how he got his job. Said this head man, "When I came to work for this company 20 years ago, I made up my mind I was going to become general manager. I figured I would need the help and goodwill of everyone in the organization if I was to succeed in this ambition. So I deliberately set about winning the friendship of every person I contacted.

"Sooner or later just about everyone in the organization was in some way indebted to me. When a chance for advancement came my way, everybody was pulling for me to

get the promotion, and I got it. *This pleased all my co-workers, and they were interested in helping me get further promotions.* In no other way could I have become general manager so quickly and with so little friction."

This executive deliberately utilized the friendly feeling of his co-workers to aid him in securing advancement. But at the time I knew it was obvious that his policy of doing favors for others had become such a habit that he continued to go out of his way to help anyone he could.

The case of this executive also emphasizes the value of gracefully receiving and acknowledging the assistance and cooperation of others. Apparently this in itself is something of an art, for many men who like to help others find it difficult to accept favors with good grace. So far as securing advancement is concerned, stiffnecked inability to be grateful for the cooperation of others must be rated as a liability.

Of course the general manager referred to was by no means just a back-slapping do-gooder. He also possessed those solid qualities that earned him the respect of his fellow-workers.

In most organizations there are a number of men who are well liked by everyone, yet who never are seriously considered for promotion to supervisory rank. They are good fellows, of that type who have no enemies but themselves. Everybody likes them, but no one takes them seriously.

Infrequently, a man of this type does receive promotion, even to ex-

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ecutive rank. As a boss he emphasizes kindness above everything in dealing with subordinates. He does not hold people accountable for their errors, but covers up for them with his superiors. He works very hard himself, but does not insist that others do the best work of which they are capable. He is well liked, but little respected. After a



"... if people would rather be away from him ... he would do well to demonstrate more kindness and sincere friendliness ..."

time management regretfully replaces him with a firmer type of head man, and vacationtime is over in that department.

In evaluating the degree of liking and respect accorded any individual by his fellow-workers, it is interesting to check the eight essential qualities of leadership (intelligence, integrity, forcefulness, fairness, loyalty, kindness, knowledge of work and health) and see how each of these qualities tends to enhance either liking or respect, or both. The reader may readily make this analysis.

What may be more difficult is that the employee who is interested in

securing promotion to supervisory rank should have a fair idea of the extent to which his fellow-workers like and respect him. The desideratum here, of course, is balance. The man must make friends and win their respect. We respect a man because he is a good workman, because he is smart, because he knows when to be firm and because he possesses integrity and has the courage of his convictions. A man may win the liking of his fellows without being wishy-washy.

Perhaps the best guide here is the attitude of one's co-workers, day-by-day, on the job. If the employee is popular, and obviously has many friends, he is well liked. If these friends are little interested in his opinions he is probably too well liked and needs to inject a little forcefulness into his dealings with these people. He can demand respect without sacrificing too much liking.

On the other hand an employee may be a good worker, and his expressed opinions indicate thought and carry weight. *But if people would rather be away from him than in his company he will do well to demonstrate more kindness and sincere friendliness in dealing with others.* Again, this can be done without any marked sacrifice of respect.

One reason it is important for a prospective supervisor to know what his fellow-workers think of him is that management considers this matter of paramount importance in selecting new supervisory material. Usually, the man chosen will be expected to supervise people alongside whom he has been working for

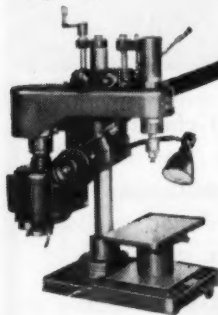
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years. These people know this man, and it is essential that they like him and respect him before he is promoted. And it is well if there already exists a fair balance between these reactions.

Management wants adequate production and knows a weak supervisor cannot secure the employee performance that adds up to such production. But management also wants harmony among its employees, and every survey that has been made emphasizes that the employee's attitude toward his job is influenced more by the treatment he receives from his immediate superior than by anything else. Hard-boiled, unfair supervisors are troublemakers. They are in a considerable minority in present-day industry, but they do exist.

In instances, an employee who is otherwise qualified for promotion to supervisory rank may outsmart himself. That is, he has somehow become convinced that there is a gimmick to everything, and in particular he is positive that promotions are awarded on a basis of taking care of favorites.

Over a period of years I have studied this matter of promotions in many organizations all over the country. I have observed evidences of nepotism, but only rarely. Nowadays a relative of the boss is liable to have hard going, with the boss and all his lieutenants leaning over backwards to prove they are not playing favorites.

I have seen some indication of favoritism within governmental organizations. But under private en-

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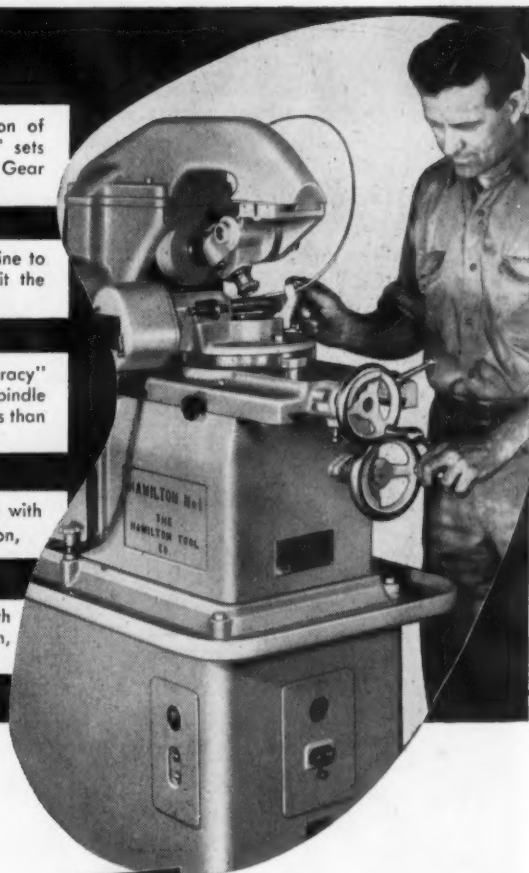
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terprise any company that permitted supervisors to be selected on any basis other than ability, latent or demonstrated, would have difficulty remaining in business.

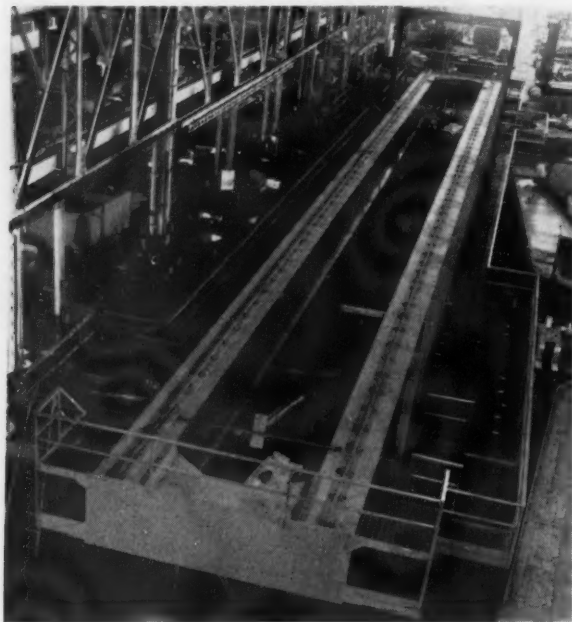
Perhaps the nearest thing to favoritism that operates in the selection of these future executives occurs when a man is chosen because he is well liked, both by his fellow-workers and by his superiors. But likeableness is an essential quality in a potential supervisor, and certainly management would be showing poor judgment if it selected an unlikeable person to supervise a group of employees.

Promotion to supervisory rank is the one sure method by which the skilled artisan may further improve his position in industry. This mat-

ter of getting ahead is in the best tradition of equality of opportunity, in the greatest industrial democracy on earth. Some skilled workers dislike the grief that comes with added responsibility, and these workers will continue to form the hard core of a great production team.

The one in six or seven who is chosen as a supervisor of some sort is a very fortunate individual. He will do well to exert himself to master this new trade of directing the efforts of others as quickly and thoroughly as possible.

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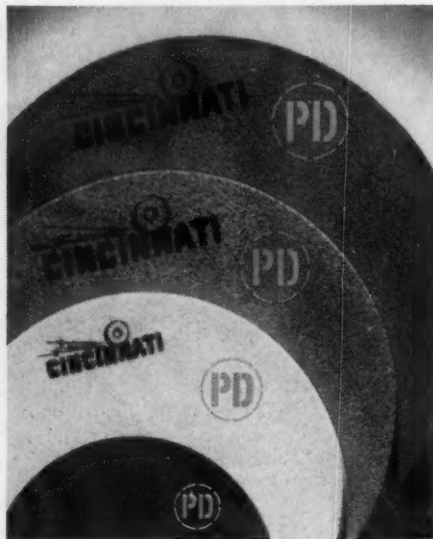
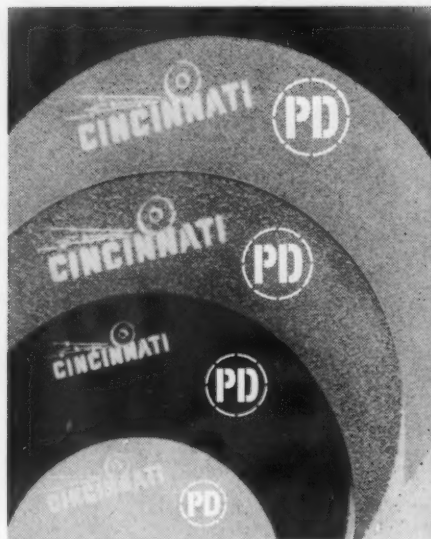
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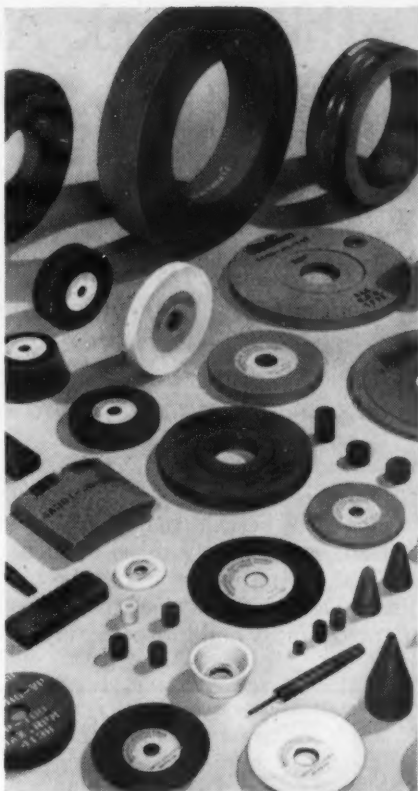
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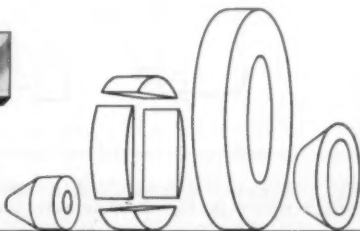
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Lathe Chuck Adapted For Multiple Work Holding

By W. M. HALLIDAY

In which the author illustrates and describes how an ordinary four-jaw lathe chuck was modified for holding several bearing sleeves so that unusual types of grooves could be machined simultaneously in the sleeves by means of a single cutter.

FOR the more efficient performance of certain machining operations, particularly those of turning and boring in the lathe, the ordinary lathe chuck can often be adapted simply and inexpensively to

constitute an effective quick-acting multiple work holder. Such chuck adaptations are especially feasible in cases where large numbers of identical components have to be machined in a similar fashion on an

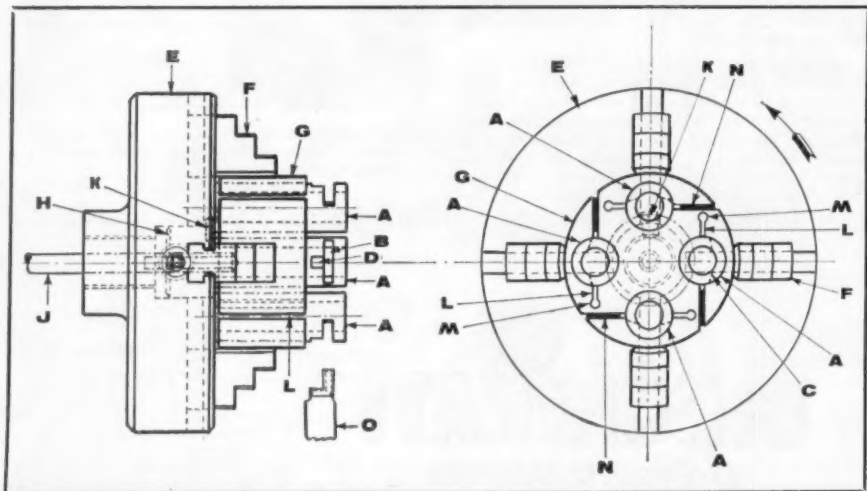


Fig. 1—Drawing of lathe chuck modified for holding several sleeve type components of the design shown in Fig. 2 while machining grooves and flats therein simultaneously using a single cutter.

economical mass production basis.

An interesting example of such a time-saving chuck modification is shown in Fig. 1. This modification was developed and successfully employed to simplify the holding of several sleeve components for simultaneous grooving in a lathe by means of a single cutter.

Figure 2 shows the design of the component, which comprises a phosphor-bronze bearing sleeve, *A*, one of which was to be tightly press-fitted into the front endshield and another into the rear endshield of a small electric induction motor to provide long-life bearings for the rotor shaft. Lubrication of the latter was effected by means of the usual ring-oiler straddling loosely around the shaft within a groove in the sleeve and picking up oil from a reservoir in the endshield casting.

The sleeves were first parted-off to correct length in a turret lathe, using pre-machined precision size spun-cast tube. The next operation, in which considerable difficulties were encountered, comprised cutting the narrow groove *B* through one side wall so that it extended partially into the bore of the part for the admission of the brass oil-thrower ring. It will be observed from the sectioned view *X-X* at the right in Fig. 2 that the base *C* of this groove is turned radial, but to a much larger radius than that of the sleeve. The small flat *D* is provided as a seat for a small spring-steel clip retainer, which passes partly over the groove and whose function is to prevent the oil-pickup ring from being bounced completely out of the groove during the operation of the motor.

The original method followed to form such grooves and flats consisted of gripping each sleeve separately in the usual self-centering chuck and feeding two cutters successively into the part, one to form groove *B* and the other to reproduce the shallow flat *D*. Because of the large

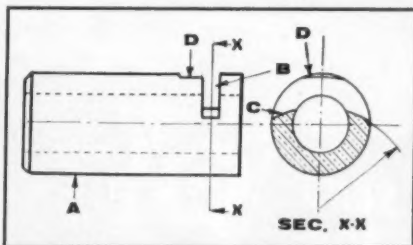


Fig. 2 — Sleeve type component for which lathe chuck shown in Fig. 1 was modified so that several of these components could be machined simultaneously by means of a single cutter.

quantity of sleeves to be machined in this manner, the method proved far too slow and costly. On the other hand, it was not possible to employ a specially designed holding fixture of elaborate construction capable of holding a number of sleeves at a single setting owing to restrictions placed on tooling costs.

Figure 1 shows how such work holding limitations were very satisfactorily overcome by means of an inexpensive adaptation of the ordinary independent four-jaw lathe chuck *E*, which permitted four bearing sleeves to be mounted at a single setting for turning the eccentrically situated grooves, and so on. Jaws *F* preferably should be of the soft type, unserrated on their inner gripping faces. They should previously be trued up so as to grip truly concentric.

The hardened and tempered cast-steel disc *G* has a concentric boss, *H*, formed integrally on its left-hand side. This boss is a close slip fit within the plain portion of the bore at the front of the chuck. The length of the largest portion of the disc normally situated within the jaws is approximately two-thirds the overall length of a sleeve component, *A*.

This allows the latter to project enough from the front of the disc for proper grooving tool clearance.

Boss *H* is drilled and tapped centrally upon the left-hand end to receive the long steel drawbar *J*. This member passes freely through the bores of the live spindle and the chuck and, by means of a nut and washer (not shown), can be

tightened up against the rear end of the spindle so as to draw the disc securely to the front face of the chuck as depicted. The disc is located in the correct radial relationship and restrained against accidental rotation when the chuck jaws are slackened by the hardened steel pin *K*, which is tightly driven into one side of the boss *H*, projecting therefrom sufficiently to engage easily within one of the four T-slots in which the jaws are carried.

In the protruding largest portion of disc *G* four holes are accurately

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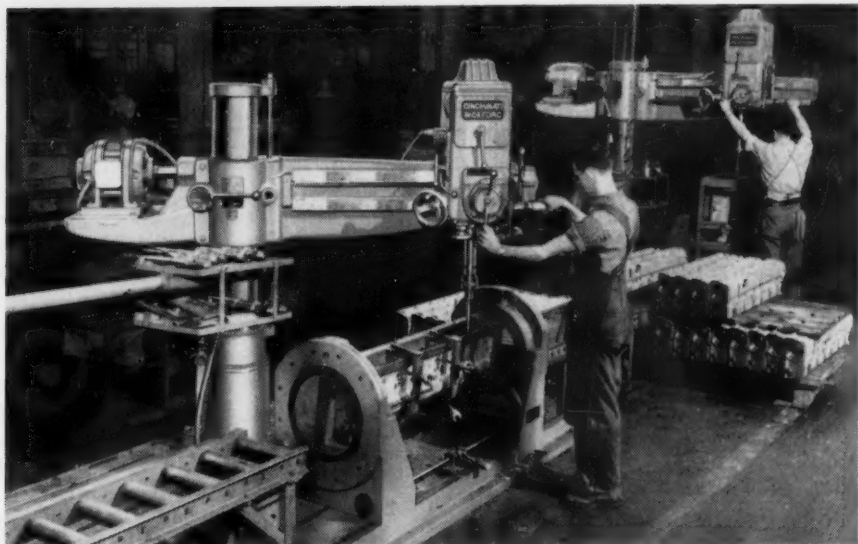
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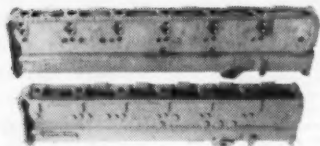
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Camshaft Housings for new Caterpillar DW21 Wheel-type Tractor illustrated in insert picture, showing casting before and after drilling operations.

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bored, these being axially in line with each other and parallel with the length axes of the live spindle and chuck mounted thereon. The holes are equally spaced around the same pitch circle and are all the same diameter. This latter dimension is such as to permit the sleeve components *A* to be a close sliding fit therein. The holes are machined

completely through the large front portion of the disc, being slightly clear of the outside diameter of boss *H* at the rear of the member. The sleeves may thus be mounted in place with their left-hand endfaces bearing flush against the front face of the chuck, thereby ensuring their correct endwise location relative to the grooving tool mounted on the machine cross slide.

Passing diametrically across the center of each sleeve-bearing hole is the narrow slot *L*. As clearly shown in the end view at the right in Fig. 1, this slot, in each case, passes completely out to the periphery of the disc at one end, while the other end terminates in the hole *M* which is drilled axially through the disc.

After slotting in this manner, the cast-steel disc is hardened and tempered so as to impart a degree of "springiness" to the outer segmentally-shaped portions adjacent to

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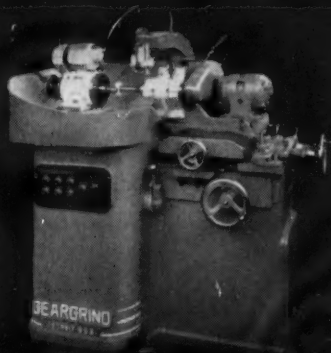
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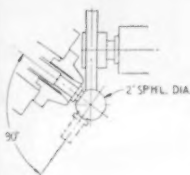
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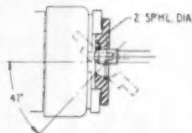


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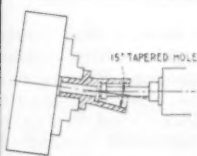
Typical examples of work performed on the Geargrind Universal Precision Grinder



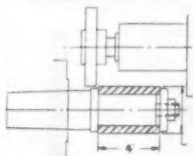
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each slot *L*. After such heat treatment and prior to mounting the disc within the chuck jaws for regular production use, the slotted portions are sprung slightly apart and the hard rubber strips *N* are inserted—one within each slot—as shown in the end view at the right in Fig. 1. The thickness of the rubber strips is approximately 0.020 in. greater than

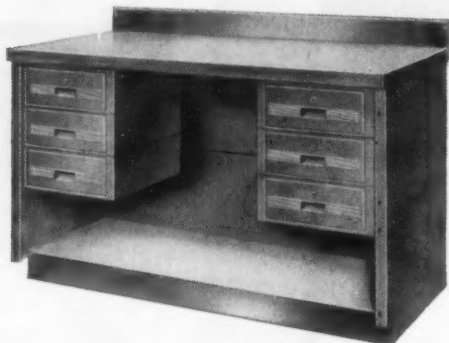
the normal (unsprung) width of slot *L*.

Such strips perform a twofold function. First, they ensure that the respective segmental portions beyond each slot will be instantly expanded the necessary small amount when the chuck jaws are released, so as to permit sleeve component *A* to be readily extracted from or inserted within the

disc bearing hole. Secondly, the rubber strips act as seals to prevent the accidental ingress of oil, swarf or chips during operation. Their action is supplementary to the natural "spring" imparted to the heat treated disc.

In use, the chuck jaws are first well retracted to admit the bossed disc, which is located in a certain radial position; that is, with each sleeve - bearing hole lying centrally underneath a jaw, so that the latter may bear approximately centrally upon the segmental portion. The

standardize on standard



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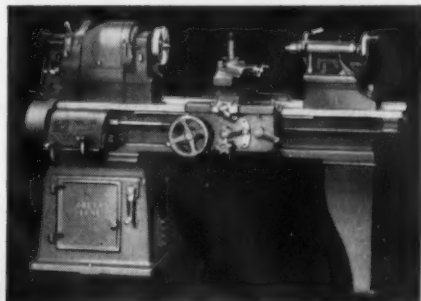
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disc is then retained positively in place by tightening the drawbar *J*.

Four identically pre-machined sleeves *A* are next inserted within the respective bearing holes through the disc as shown. The correct end-wise location of the sleeves is determined quickly and simply by reason of their abutment against the front face of the chuck itself. Each sleeve

is retained in position merely by adjusting the adjacent jaw which, as it tightens down upon the slotted segmental portion, causes the same to close inwardly about the sleeve. Thus, a powerful grip is obtained on each sleeve without risk of distorting the member or inflicting damage to its outer machined surface.

The grooves *B* and flats *D* are

simultaneously reproduced by a single composite cutter, *O*, of the parting-off type, which is mounted upon the cross slide of the lathe. The correct depth of slot is determined by means of a fixed stopplate which is fastened to the slide guideways and which controls the amount of tool penetration in the customary manner. Since all four sleeves *A* are situated the same distance from the center of the live spindle and chuck, each will be grooved exactly the same depth at one pass of the cutter.

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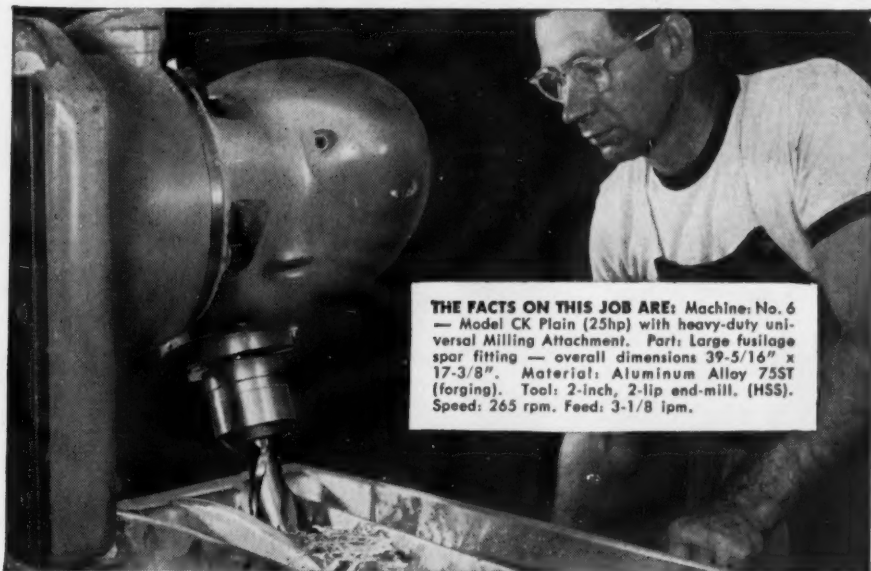
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- CK's new heavy duty (2" dia.) table feed screw gives greater bearing contact for smoother feed performance and sustained accuracy.
- New CK machines have greater horsepower.

On this job, 25 hp permitted operator to get maximum production from this modern cutter.

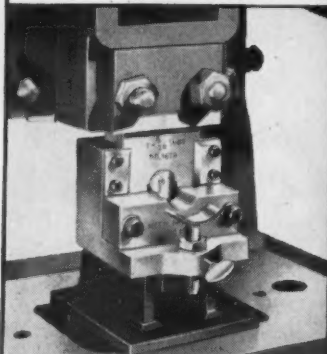
HERE'S a typical example of how relatively inexpensive tooling greatly increases the versatility of Kearney & Trecker's new CK milling machines . . . producing a completed part every 6 minutes. Two operations were required for each part — (one) milling out the holes and recessing on the edges, then after changing the attachment setting and cutter — (two) finishing the inside (see photo). For the full story, contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.

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pieces it is only necessary to slacken each jaw a slight amount in turn to allow the slotted segmental portions to expand.

An adaptation of this type will, of course, prove satisfactory and economical for holding workpieces of different diameters provided the grooves in respective parts may be situated upon the same pitch circle. The same setup may be employed with components of different lengths, or those which vary in respect to the endwise location of the grooves. The former differences would be accommodated merely by altering the length of the largest diameter portion of disc *G* normally situated within the chuck jaws. Variations in the position of grooves along the component would be controlled in a simple manner by the setting of the tool and lathe carriage relative to the chuck.

With a chuck adaptation of the type described in this article, the time required to set up and groove each sleeve component was found to be 85 per cent less than with the previously used method.



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Proper Use of TOLERANCES Can Reduce Costs

By CHARLES A. KOEPKE

Based upon the suggested A.B.C. system, the author proposes that the production department be responsible for selection of total tolerance distribution.

THERE is no question that tolerances for machine dimensions are here to stay; they got their foot in the door sometime ago and are becoming more of a problem every day. Every shop which makes parts for interchangeable manufacturing from wheelbarrows to precision gyros must have dimension limits for its parts to insure easy assembly. Recently, a number of excellent articles have discussed standardized fits and limit systems which can be used for many different kinds of industry. The range from coarse to fine limits in the proposed A.B.C. system is able to cover the entire range mentioned above. This system is the result of international cooperation between the three major English-speaking nations — America, Britain and Canada.

The A.B.C. system covers a wide range of sizes from 0.040 to 19.690 in. inclusive with a wide variety of fits and their respective limits. It is divided into 13 subranges where

each hole or shaft has its own fundamental tolerance listed to obtain the necessary grade of accuracy. Thus, a shaft with a nominal diameter of 1 in. may have tolerances ranging from 0.00025 to 0.012 in. to provide the proper grade of accuracy for any one of the 13 subranges. In fact, the proposed A.B.C. system has covered a range so great that some commentators seem to feel that, since their plant does not need such a wide range, the system includes too much. However, we never refuse to purchase or use a new modern dictionary because it has words in it we never expect to use.

In general, any tolerance system, including the old A.S.A. and the proposed A.B.C., lists three major families of fits. If the products to be manufactured run from simple to complex, the fits probably would include: (1) shaft always smaller than the hole, (2) shaft slightly smaller or larger than the hole, and (3) shaft always larger than the hole. The

amount of these differences tends to define the quality of the fit from precise to sloppy.

To aid the designer to select the type of fits he needs, some design departments have a set of gages to illustrate the various families of fits generally used for their products. The designer gets a sense of feel for the different fits and it helps him to determine what he should specify in terms of the system used. This sense of feeling the fit could be used only in the clearance fits.

It is easy to see that names for fits can be interpreted differently by individuals or even by the same individual under extenuating circumstances. Thus, each grade of fit should be designated by a number such as RC_1 (in the A.B.C. system) which is on the precision side of a series of "Running Clearance" fits. The range of maximum diametral clearances for a 1-in. shaft listed in

the RC fits runs from $+0.010$ to $+0.00095$ inch. This range covers RC fits from RC_8 down through RC_1 . None of the minimum clearances in the RC series goes as low as line to line or zero clearance. However, in the L. C. (location clearance) series a number of the fits in this group have zero clearances.

The series of tables lists maximum

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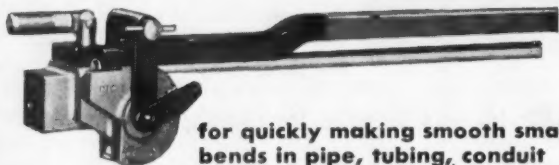
and minimum clearance or interference for each fit. This is a most valuable portion of the A.B.C. system. These tables also show how the total tolerance limits are distributed between the hole and shaft. This standard distribution can be important, especially during periods of severe international strife when interchangeability of parts for assembly and repair are necessary between friendly nations. It also can be important when finished assemblies or parts are purchased from vendors. Standard tolerances used by the vendors can be used by the purchaser to insure precise assembly operations without the need for rework to make the units fit.

The distribution of these total tolerances between the hole and shaft in the various classes of fits in

the A.B.C. system, however, has an entirely different aspect when we consider the possible effect on local manufacturing costs. For a large majority of parts, excepting the categories mentioned above, the distribution of the tolerances to the hole and shaft by the designer, either from tables or otherwise, has a variety of expensive possibilities.

We all have our own examples of absurd tolerances which could be collected for the boners of the month. My candidate for the gold plated leather medal is the designer who specified a $+0.002$ -in. diameter tolerance for eight $1/4$ -in. holes used for bleeding exhausted air from an air turbine. Since when does free air at low pressure come in fairly accurate cylindrical form? (We finally cored the holes in the casting.) However,

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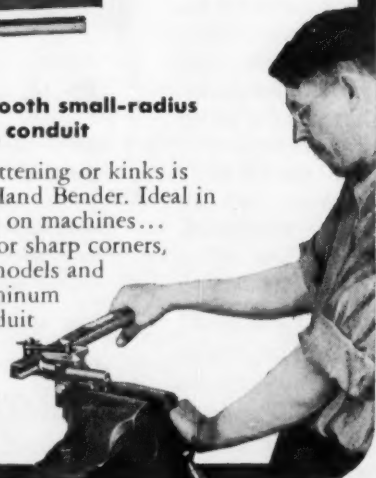


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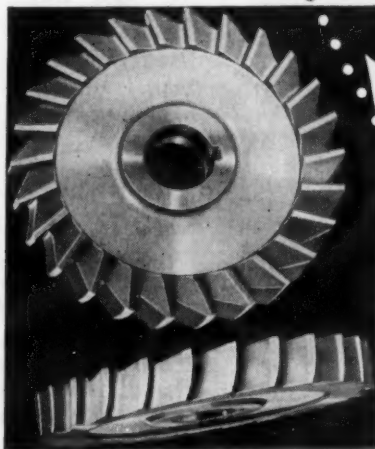
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 (1) L. H. Half Side Milling Cutter.
 Feed: 10-1 2"

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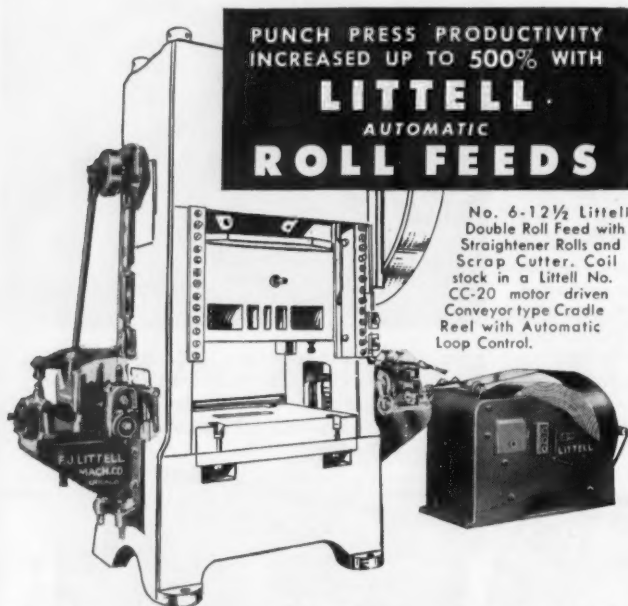
we are not thinking of the tolerance freaks which appear from time to time. They often are so obvious that even the apprentice machinist becomes suspicious of them.

We should, however, be definitely interested in the way the difference between the minimum and maximum clearance or interference for the various grade of fits is finally

distributed to the hole and shaft on the piece part drawings. This difference is later called T.D. (total difference). When each designer attempts to apply his own ideas, either from experience or insufficient information, to the complicated problem of tolerance limits, aggravated trouble appears on the production horizon. The consistency between de-

signers regarding tolerances often is known for its variables.

Some designers, in an attempt to keep out of trouble, specify their tolerances in tenths. Others specify a closer tolerance than they really can justify with the hope they will get what they actually need. Both of these are bad practices because Production may take the tolerances seriously, which will result in a higher production cost. Or equally bad, someone not qualified to make the decision may take liberties with the tolerance to bring it down to his idea



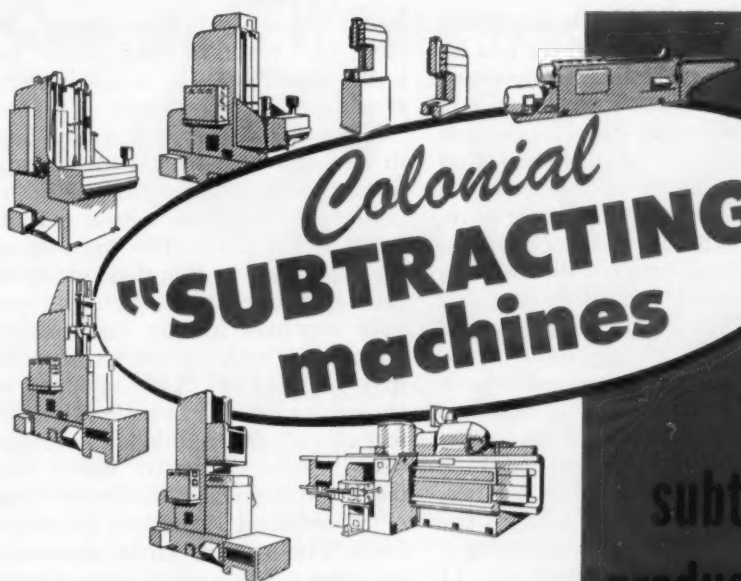
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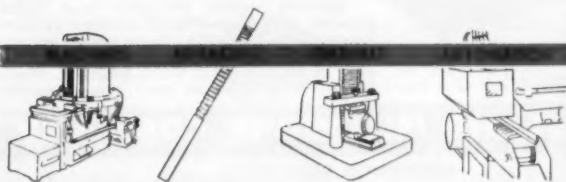
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they
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...add
to
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Unified Broaching



of adequacy. Thus, the designer may step out of the design frying pan into the production fire. Unnecessarily close tolerances start up a chain reaction to insure high production costs. Designers should learn that good tables of recommended fits can help them and their company to reduce production costs and to gain mutual respect between the designer and production personnel.

The A.B.C. system supplemented with tables for unique local conditions should be able to clearly specify the T.D. value between the hole and the shaft for a specific fit to perform satisfactorily for any specific operating condition. For instance, the necessary T.D. values to get the same operating conditions may vary with different materials such as: (1) steel in steel, (2) steel in non-ferrous

metal, (3) non-ferrous metal in steel, (4), metal in rigid plastic (e. g. bakelite), and (5) metal in non-rigid plastic (e.g. nylon).

The total tolerances also may vary in the above materials, depending upon whether the fit desired is intended to control or restrict motion between the parts. The freedom of the controlled motion depends upon the degree of control which may run from very loose to snug. The restricted motion with an interference fit may be specified in inch-pounds of torque to transmit or resist. The effect of wide fluctuations in temperatures, where dissimilar metals are used, can seriously change the type of fit obtained at normal temperatures. The system can be expanded to cover other combinations of operating conditions when the design

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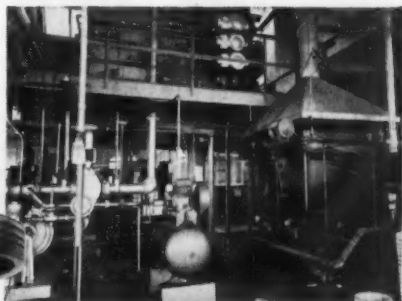
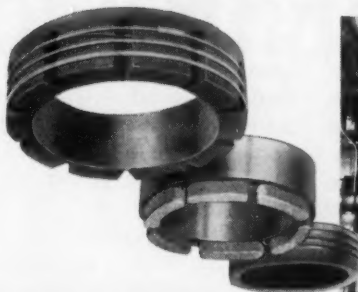
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From the NEW Blanchard Wheel Shop



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For more than 25 years, Blanchard has directed its efforts toward developing the best grinding wheels for Blanchard Surface Grinders. It began by pioneering with silicate bonded wheels, and then resin bonded wheels. Now, from a new, ultra modern Blanchard wheel shop come *vitrified wheels* ... scientifically batched, pressed and fired ... with positive control of time and temperature.

Today, Blanchard offers complete wheel service ... silicate, resin and vitrified!

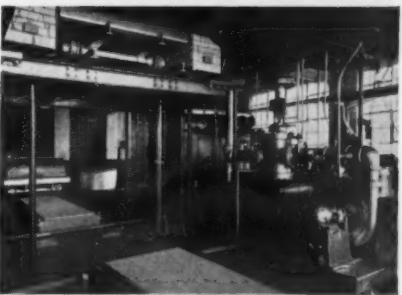
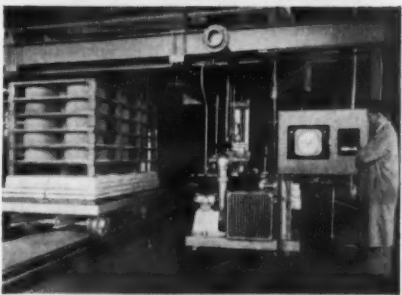
Use Blanchard wheels on your Blanchard Surface Grinder. They do a better job in less time, with less trouble and cost ... whether your work is tough as copper or fragile as glass ... whether it requires heavy roughing cuts or clean-up cuts with flatness to .000005" and finish of 1 micro-inch.

for Better Blanchard Grinding



THE BLANCHARD MACHINE CO.

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Please send free copy of Blanchard Wheel Booklet and Wheel Holder Folder. MMS

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specifications require new values for total tolerances to satisfy the new operating conditions.

Few experienced persons would question the designer's responsibility for specifying the class of fit necessary to make his device function properly. Hydraulic servos for controlling aircraft surfaces must have extremely precise tolerance limits. The total tolerance for two mating parts in such a servo are often ex-

pressed in tenths or less. Here again, the designer is primarily interested in the T.D. plus or minus between the mating parts. Furthermore, adequate tables based on the quality of the fit desired will prevent the designer from going overboard because he may be called upon to defend his choice if supervision should challenge him.

The inherent ability of any high grade machinery in the plant to pro-

duce to close tolerances should not be used by the designer to specify his tolerance limits. The quality of the fit to serve the function *must* be the deciding factor to determine the total tolerance present between the hole and the shaft.

To design a new product with its tolerance possibilities tied to the worst or the best machinery in the plant may cause frustration on one hand and higher than necessary cost on the other. If any tolerances are determined by the ability of the best machinery to produce them,

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BAR STOCK

METAL CARBIDES CORPORATION
TALIDE
YOUNGSTOWN 7, OHIO

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HEAVY METAL - CERMETS - HIGH TEMPERATURE ALLOYS
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Many times more durable than steel, Talide Metal adds years of life to the wearing edges of tools, dies, machinery and equipment. Hard as a diamond and almost indestructible, it triples output per man and per machine. For good service and recommendations for improving any cutting, drawing or wear-resistant application, send particulars to Metal Carbides Corp., Youngstown 7, Ohio. Write for Catalog No. 54-G

Tool Grinders by Ex-Cell-O



STYLE 44-A, Ex-Cell-O Precision Carbide Tool Grinder. A new model for sharpening single point tools. Inbuilt motor precision spindle. Ample pressure coolant flow.

**FOR CARBIDES —
CAST ALLOYS —
HI-SPEED STEELS**

A complete line of grinders, for efficient and economical sharpening of single point tools. All are double-end models using cup type wheels; with large tool rest tables, easily adjusted.



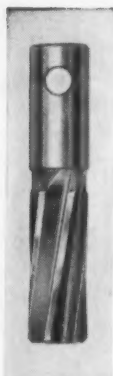
WRITE FOR THIS BULLETIN

It shows and describes five models; also gives important data on tool grinding. Write today to Ex-Cell-O in Detroit for Tool Grinder Bulletin.

**EX-CELL-O
CORPORATION**
DETROIT 32,
MICHIGAN

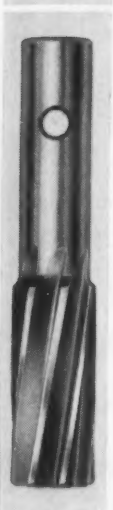


54-40



**STANDARD DIMENSION
STUB SCREW MACHINE
REAMERS**

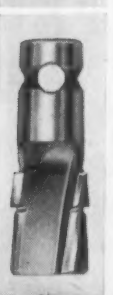
Finished blanks in stock: Sizes No. 00 to No. 23 to grind from .0600" to 1.0100". Tolerances unless otherwise specified plus or minus .0001".



**BUOL SPECIFICATION
STUB SCREW MACHINE
REAMERS**

For larger type Gridleys, Chucking Machines, Turret Lathes, and Hand Screw Machines. Also used extensively for second operation work.

Finished blanks in stock to grind from .0930" to 1.2500". Tolerances unless otherwise specified plus or minus .0001".



**SPECIALS
MADE TO ORDER
PROMPTLY**

Backed by 27 years of manufacturing experience on reamers exclusively, we also make Die Clearance Reamers, Helical Taper Pin Reamers, Carbide Tip Reamers, and Special Reamers to your blue print specifications and requirements.

Write for bulletin giving full details.

MANUFACTURERS' AGENTS: A few exclusive territories still open. Write us.

THE BUOL MACHINE CO.
MEADOW & PARK STREETS
NEW BRITAIN, CONNECTICUT

the plant may need to purchase additional high cost precision machinery to handle the unnecessarily close tolerances. Meanwhile, the machinery which would have been good enough may stand idle.

Since the designer serves his function, tolerance wise, when he specifies the necessary quality of the fit, the T.D. assigned to that fit generally should be distributed between the hole and shaft by the person who is best qualified to do it.

A sample block compiled from the RC₁ group of fits in the 0.24-0.40-in. family is shown below.

T.D. = 0.0004 in.
Min. Loose = 0.0002 in.
Max. Shaft = Basic Hole minus 0.0002 in.

This information may be used to aid the designer to specify an RC₁ fit on his layout for a basic 0.275-in. hole and its shaft. This information tells the designer that the minimum clearance is 0.0002 in. and the maximum clearance is 0.0006 in. (T.D. + Min. Loose). This is all that the designer needs to know about a fit. How it is obtained is production's problem. The draftsman on the original drawings for the above piece parts is instructed to split the T.D. value 50-50 between the hole and the shaft. However, as shown above, the maximum shaft size = basic hole minus 0.0002 in. (or 0.2750-0.0002 in.) = 0.2748 inch. Thus, the first prints to Production for their study would have the tolerances for these parts shown as follows:

Hole,	0.275	+ 0.0002
		— 0.0000
Shaft,	0.2748	+ 0.0000
		— 0.0002

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Dial Snap Gages Dial Snap Gages

"D" (Direct) TYPE "L" (Lever) TYPE

Introducing a new type of pin locking mechanism which maintains constant parallelism between anvil faces.

8 SIZES, each with 1" range, cover overall range 0" to 8"



Fully enclosed movement and indicator protected against damage. Set-back indicator and handle permit entry into narrow recesses.

Wide choice of indicators.

8 SIZES, each with 1/2" range, cover overall range 0" to 4"

NEW!**NEW!**

Dializers®

STANDARD's original device for converting

AGD Adjustable Limit Snap Gages to DIAL Snap Gages now available with wide range of indicators from 1 1/8" to 2 1/4" diameter, graduations of .001", .0001", .0005" and .00025", and a wide variety of dial markings, including metric.



Available separately for your frames or assembled in AGD frames supplied by us.

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STANDARD GAGE

presents a number of

NEW

PRODUCTS

each deliberately designed to help you do a better job

PARALLOC DUAL THROAT Midget Dial Comparator

A most useful and versatile gaging instrument. Upper throat is deep, for measuring flat work pieces and stock. Lower throat designed for gaging small round or cylindrical pieces. Three-eighth inch range. May be used as dial comparator at inspection bench, or gage may be detached and brought to work piece like a dial snap gage.

Dial Bore Gages



Three new models extend dial bore gaging range by intermediate steps down to 1/8" diameter. Each utilizes STANDARD's new, highly practical CENTERING-SIZE DISC principle. Simple in design, easy to set, easy to use, but amazingly accurate and effective in small bore gaging.

STANDARD Dial Bore Gages now available in 10 sizes covering range from 1/8" to 24"

PATENT APPL. FOR

NEW!

We invite your investigation and trial of these new gages, each designed to help YOU.

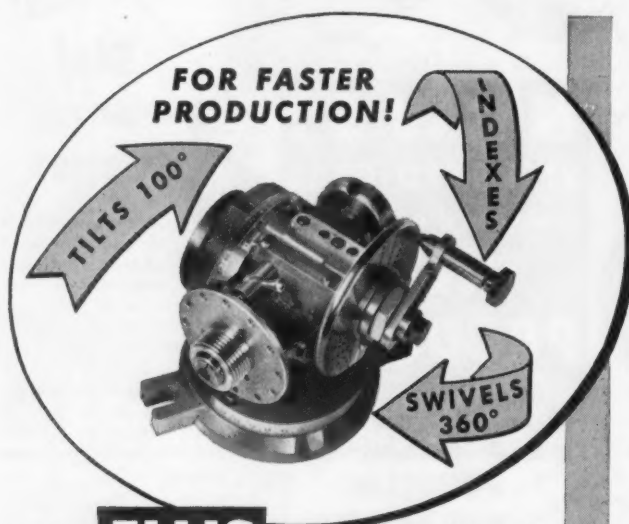


Write for brochure on "NEW PRODUCTS" for more complete details on these instruments.

Production must decide if they wish to change the original 50-50 distribution of this T.D. value. They may elect to use any distribution of the T.D. value (0.0004 in.) between the hole and the shaft which will produce the parts at the lowest cost. For instance, 0.0003 in. to the hole and 0.0001 in. to the shaft will be as interchangeable within this dis-

tribution as the reverse of this assignment. However, if Production later wants to change their original choice, not all of the parts made under their second choice will be interchangeable with the first choice for repairs, and so on. This, of course, will happen also if the designer had the power to redistribute the T.D. value.

Certain groups in production usually are better qualified to distribute the assigned T. D. between the hole and shaft to get the lowest overall production cost consistent with the fit specified. These groups, such as Methods and Inspection, can consider the variables involved in the machines available in the shop or from the machine tool salesmen. They know the quality of the gages and the auxiliary tools on hand and the combined skills of the available mechanics. Furthermore, they are very conscious of the cost of scrap



the **ELLIS** dividing head

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions—swiveling in two planes—will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

76-H MAMARONECK AVE., WHITE PLAINS, N. Y.

NICHOLS-MORRIS CORP.

WRITE

Here is a picture of an...

OBSOLETE BORING SETUP!

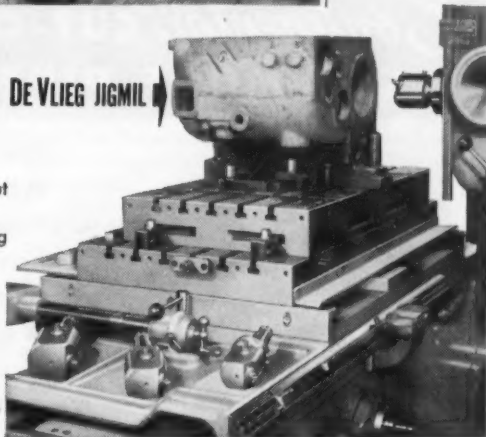


THIS PICTURE—taken in a well known machine tool plant illustrates the old method of boring turret lathe headstocks with a costly inflexible box jig and a mass of special tooling

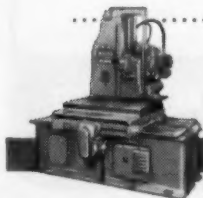
The Modern Method "JIGLESS BORING" THE SAME PIECE ON A DeVlieg JIGMIL

- Eliminated expensive boring jig
- Reduced machining time
- Improved accuracy with a resultant cut in assembly costs
- Permitted the use of simplified tooling

If your shop is burdened with costly boring jigs and special tooling, it will pay you to investigate the DEVLIEG SPIRAMATIC JIGMIL



Come to Detroit... see a practical demonstration of the JIGMIL Technique...



DEVLIEG MACHINE CO.

A request on your company letterhead will bring a copy of our comprehensive Illustrated Catalog

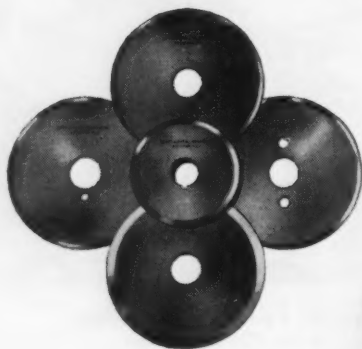
when tolerances are close. These production variables vary within themselves from time to time and the production group affected most by the change should be allowed to recommend the first redistribution within the T.D. value selected by the designer.

A very potent reason for allowing Production to distribute this T.D. value between the hole and the shaft concerns the accumulated cost differences between mating parts. For example, the part with the hole to machine may have accumulated costs from an expensive material and a number of previous operations. The shaft in this case may be a simple part with a very low cost. If the designer determines the tolerance on this hole, he might distribute most of the T.D. on the cheap shaft part. Out of a large number of examples

at hand, one was scrapping a large number of parts where the accumulated unit cost was \$20.00. The cost of the cheap mating part at this point was only 15 cents. However, this cheap part had the lion's share of the available T.D. assigned by the designer. Production had not been allowed to distribute the tolerances until after this expensive experience. At present, the 15 cent part has a minimum portion of the total, just enough to make the part producible. Thus, it is less costly to scrap a larger proportion of the cheap shafts and save the expensive pieces by virtue of the larger tolerance assigned. It must be remembered, however, that the second distribution of the T.D. value made the second group of parts not entirely interchangeable with the first.

When the quality of the fit be-

Continental CUT-OFF WHEELS CUT MORE PIPE PROFITABLY



These wheels feature Continental's exclusive "True-Angle Bevel" for faster, cleaner cuts—and more cuts between sharpenings. For all makes of rotary cut-off machines. *Also, Manufacturers of Cut-Off Machines . . . Chaser and Wheel Grinders. Request Circular, Today.*

Continental MACHINE CO.
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Get **PROVEN** ACCURACY

to **$\pm .0001''$**

Plus HIGH LOAD RATING
TO DO **MORE**
TURNING JOBS **BETTER**

THE **NEW** **IDEAL**

"Universal" LIVE CENTER

Created to meet
today's demand
for higher
accuracy—
closer tolerances

The new IDEAL "Universal" Live Center will help any plant increase the quality and accuracy of its lathe output! Because it has a load capacity actually beyond most normal requirements, you can utilize its *proven* accuracy of plus or minus .0001" on the *widest variety of jobs*. The "Universal" is equally good on light or heavy work . . . gives all the advantages of freely turning live centers even on "finicky" jobs where closest tolerances are required. Yet, you don't pay a premium to get this superior performance—the "Universal" is moderately priced! Available in Morse Tapers 2, 3, 4 and 5, for work up to 5630 lbs. Order today from your IDEAL Distributor for immediate shipment.

**ACCURACY
BUILT TO LAST**



PRE-LOADED BEARINGS

Twin, high-precision roller bearings are pre-loaded after center is assembled. Point is ground in own bearings. All parts are hardened and ground.

NEW DOUBLE SEAL

Stationary hycar sealing ring in cap keeps dirt out, slinger rotating with point keeps grease in.

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tween two mating parts demands a total tolerance limit in the lower tenths or less, the distribution of that small amount between the two mating parts creates fantastic tolerances for these parts. Production can reduce scrap and other costs by increasing the tolerance range on each of the parts to an economic spread and placing, for instance, "6 fami-

lies selected at machine" note on the tracing so that assemblies can be made from the right parts to produce the proper fit. Modern dial gages can measure parts accurately and quickly so that the machine operator can measure the parts during the machining operation and place them in the proper container for that size. Quality Control through its sam-

pling procedures can pass or reject each group of parts in the family. Thus, selective assembly to get accuracy need not be an expensive procedure. In fact, owing to the increased tolerance range for both the hole and the shaft in this method of assembly, the reduction in scrap afforded may result in a net saving.

When Production originally decide on the process of manufacture, they may redistribute the T.D. value for the fit as production conditions may dictate. The manufacturing layout or operation sheet should al-

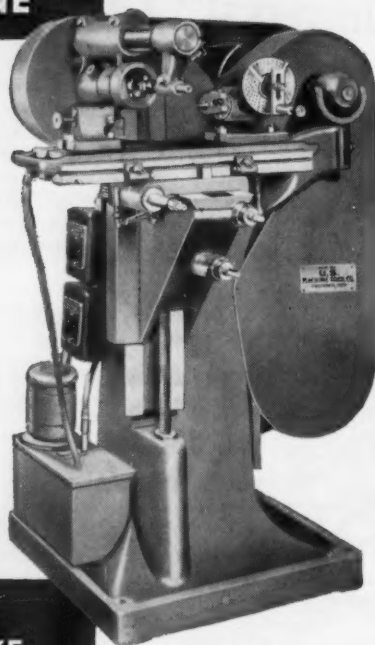
"U.S." No.1 HORIZONTAL MILLING MACHINE

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America's
Number One
Low Cost
Miller.

A Rugged
precision
hand-miller
easily
adapted to
high-speed
hand or
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Send for
complete
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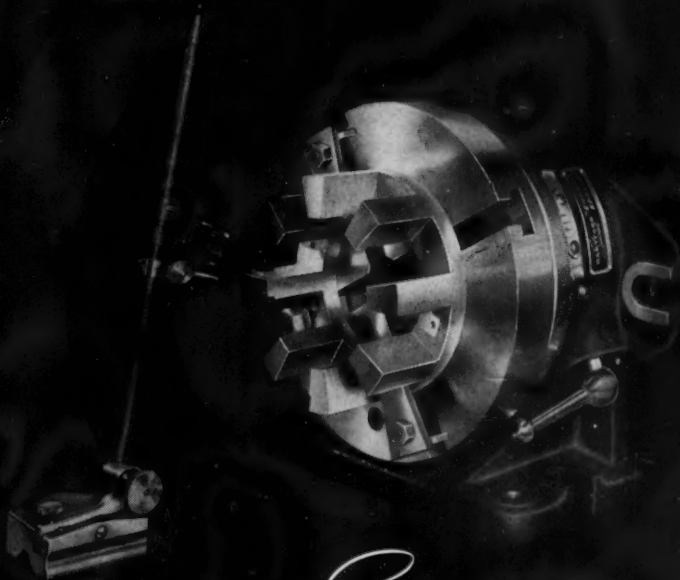


THE
U. S. BURKE
MACHINE TOOL DIV.

Brotherton Road 3,
Cincinnati 27, Ohio

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ACCURACY



HARTFORD
Special
SUPER-SPACERS

THE HARTFORD SPECIAL MACHINERY CO., HARTFORD 12, CONN.



FOR PRECISION GROOVING, RECESSING AND BACKFACING

Versatile MAXWELL recessing tools can be used on any drill press, boring mill, turret lathe, radial drill or milling machine. Ball-bearing pilots and high speed or carbide cutters are interchangeable to handle any job within range of holders.

MAXWELL recessing tools are precision built for sustained accuracy in production runs . . . yet take cuts at unusually high feeds. 4 sizes available for $\frac{3}{8}$ to 4-inch holes.

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for literature.



1056-MC

THE MAXWELL COMPANY

325 Broadway • Bedford, Ohio

ways agree with the engineering print of the part. A request for changing the redistribution of a T. D. value should not be subjected to all of the normal checks which are necessary to determine if the engineering design or performance is affected. It is only necessary to add the redistributed tolerances to determine if the T.D. agrees with the original to get the quality of fit desired. This kind of checking can be done by one person to save time and lower the cost of this simple task.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.



CLEAN COOLANTS
EFFICIENTLY
WITH THESE FEATURES



Comparison of Capacity 20 GPM Size

BARNESDRIL		Others:	
Exposed Surface Area	275 sq. in.	24"	14"
Length of Field	27 1/2"		2"
Alnico Magnets	32 lbs. total	10 lbs.	2 lbs. 10 ozs.

BARNESDRIL

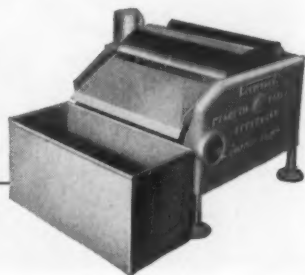
Magnetic Coolant Separator

Barnesdril Separators are engineered to give you top efficiency in reconditioning used coolant for recirculation. They process the coolant rapidly and remove in one pass, ferrous particles, entrained abrasives and foreign matter. A comparison of the above features will show you why Barnesdril Separators are your most dependable coolant cleaning method.

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BARNES DRILL CO.

ROCKFORD • ILLINOIS



Stress Relieving

"Gas Caps"

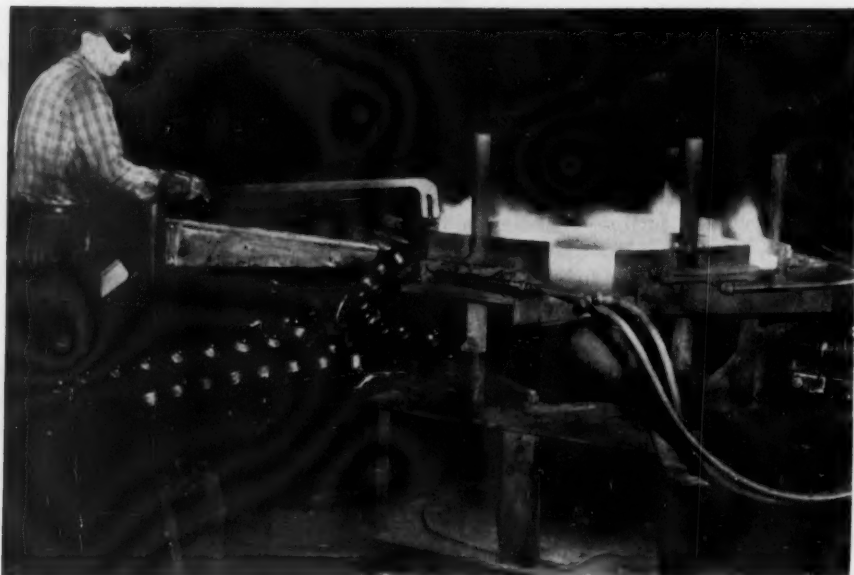
Lukens Steel Company develops assembly-line technique for producing stress-relieved heads used in fabricating high pressure steel storage tanks for liquified petroleum.

FABRICATORS of high-pressure steel tanks used to store liquified petroleum (LP) gas have experienced difficulties from cracks appearing along the rims of hemispherical heads forming the ends of these tanks. For economical reasons, these heads are cold-pressed,

thus leaving the area along the rim or "equator" more brittle than if it were stress-relieved. Given a hard bump or bang during assembly operations, cracks often appeared.

The problem was to turn out a cold-worked, dome-shaped "gas cap" in which the hardened area

Assembly-line conveyor brings 40½-in. heads to special gas-fired stress-relieving machine.

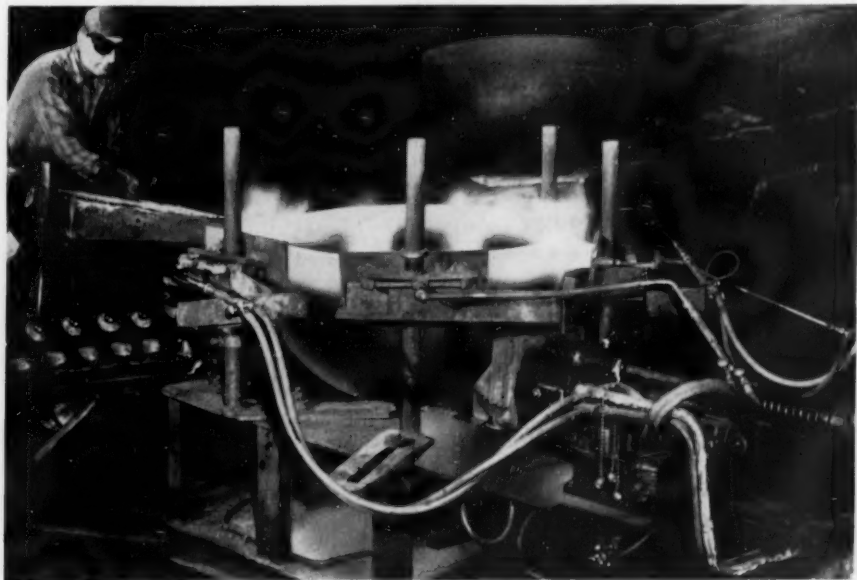


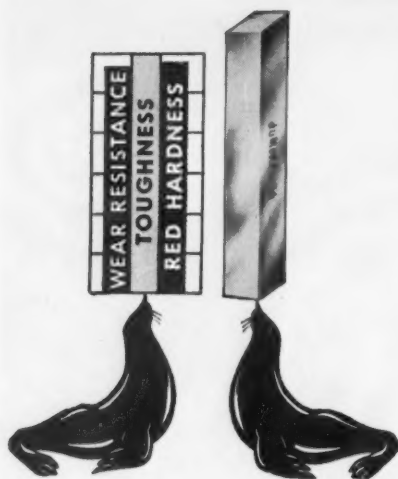
Stress-relieved "gas cap" leaves heat-treating setup and continues on assembly line to the right.

that might produce cracks was eliminated. Lukens Steel Co., Coatesville, Pa., made a thorough study of the problem and came up with an exclusive assembly-line technique of stress-relieved rims on cold-worked domes. Removal of cold-working stresses—which may run as high as

100,000 p.s.i. in this type head—provides for greater safety and better weldability.

Battery of gas burners stress-relieves entire periphery of $\frac{1}{4}$ -in thick rim for depth of about 6 inches.





du MONT
Square and Rectangular
Super High Speed Ground
TOOL BITS
are
BALANCED
to do most for you

- more cuts per bit and per dollar
- a keener cutting edge
- longer life

TRY 'EM

Make your own performance tests and cost comparisons and you'll end up buying du Mont Bits.

Write for **FREE** Comparison Chart, Size and Price List S-1

The du MONT Corporation
 Greenfield, Massachusetts

Important Meeting Dates

August 9-10

American Society for Quality Control, First Annual Western Regional Conference, U. S. Grant Hotel, San Diego, California. Society headquarters: Room 5036, 70 E. 45th St., New York 17, New York.

September 5-8

Pressed Metal Institute, Annual Fall Meeting, Manoir Richelieu Hotel, Murray Bay, Quebec. Institute headquarters: 2860 E. 130th St., Cleveland, Ohio.

September 8-10

American Society of Mechanical Engineers, Fall Meeting, Schroeder Hotel, Milwaukee, Wisconsin. Society headquarters: 29 W. 39th St., New York City, New York.

September 10-12

Metal Powder Association, Fall Meeting, The Homestead, Hot Springs, Virginia. Association headquarters: 420 Lexington Ave., New York City, New York.

September 13-24

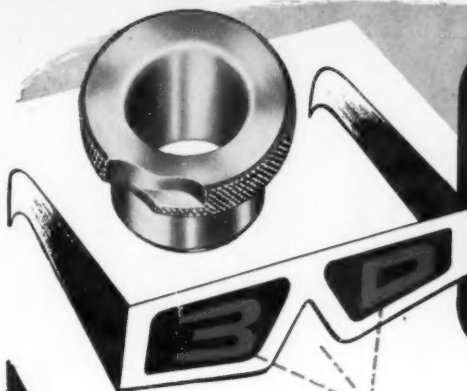
Instrument Society of America, International Instrument Congress and Exposition, Convention Hall and Commercial Museum, Philadelphia. Society headquarters: 1319 Allegheny Ave., Pittsburgh, Pennsylvania.

September 15-18

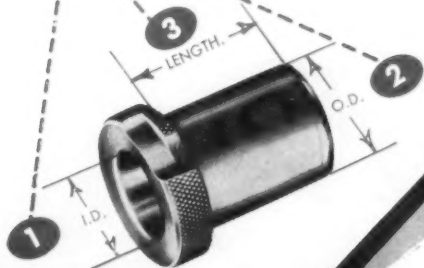
National Metal Trades Association, Annual Eastern Management Conference, Sagamore Hotel, Bolton Landing, Lake George, New York. Association headquarters: 12 S. Michigan Ave., Chicago 3, Illinois.

September 21-23

Society for Experimental Stress Analysis, Fall Meeting and Exhibit, Hotel Bellevue-Stratford, Philadelphia. Society headquarters: P. O. Box 168, Cambridge 39, Massachusetts.



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American's 3-D simplifies ordering drill jig bushings—eliminates confusing code numbers. No need to search through many pages—American's catalog shows all of their KING SIZE selection of ASA and American Standard types of sizes on two facing pages. (50% of your specials are now American's standards.) All you have to do is order 1—I.D.; 2—O.D.; 3—LENGTH.

Order American Drill Bushings the 3-D way . . . from our fully stocked distributors located in every major area throughout the U.S. You can get the right drill jig bushing when you want it!

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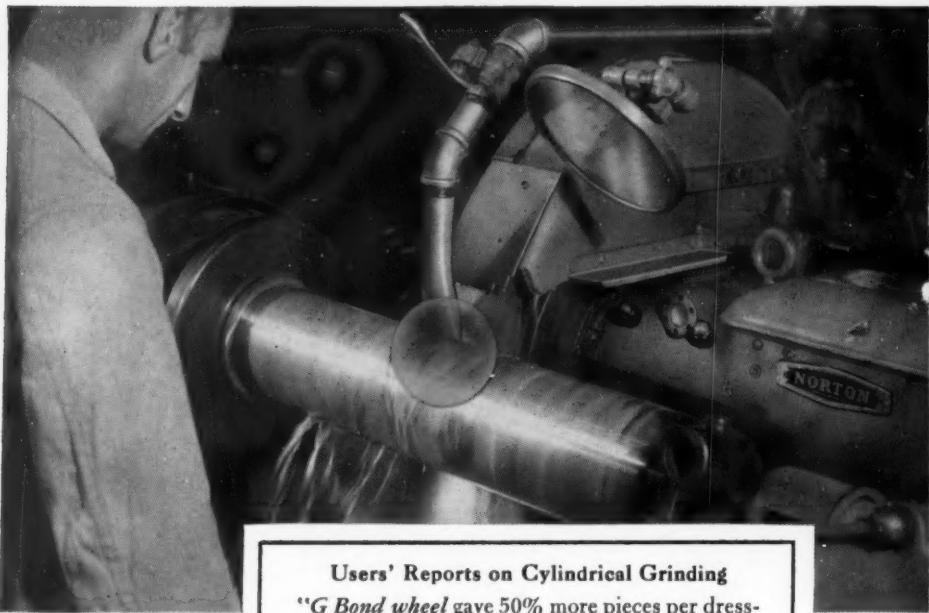
LOOK FOR  THE TRADEMARK

**SPECIALIZING ONLY IN
 DRILL JIG BUSHINGS!**

More proof of how

Norton G Bond wheels boost O.D. grinding profits

*Users praise "TOUCH of GOLD" performance that
steps up production rate and quality while cutting costs*



Cylindrical Grinding is faster, easier, more profitable when wheels made with the Norton G Bond — most efficient vitrified bond ever developed — add the "Touch of Gold."

Users' Reports on Cylindrical Grinding

"G Bond wheel gave 50% more pieces per dressing, with greatly improved finish."

"Grinding to .001" limits, G Bond wheels removed stock faster, more uniformly. Gave more pieces per dress, with less spark-out time."

"Cooler cutting, crush-trues nicely, holds form. Best wheel ever used."

"Ground sixty .075" radius grooves per dressing, compared to 25 with previous wheel. This G Bond wheel, also used on critical shoulder job, held form and gave superior finish."

Users' Reports on Centerless Grinding

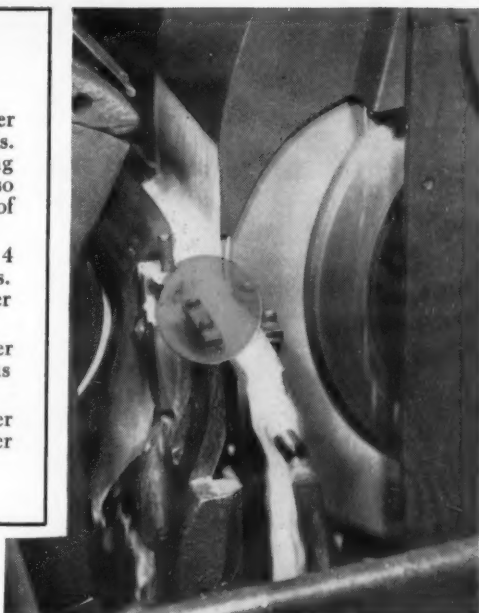
"*G Bond wheels* produced better form and finish than any other wheels. Gave 50% more pieces per dressing on both rough and finish grinds. Also eliminated previous distortion of work due to overheating."

"*Dressing required* only once every 4 hours, instead of every 40 minutes. Best general purpose wheel ever used on our centerless machines."

"*Cut faster and freer*, held size better and gave better finish than previous standard wheel."

"*G Bond wheel* gave 16 hours longer wheel life and produced much better finish."

Centerless Grinding benefits by the G Bond's unique ability to hold each abrasive grain just long enough for maximum cutting action — an important "Touch of Gold" advantage.



New users are quick to recognize these advantages of G Bond wheels for O.D. grinding:

Cooler cutting action . . . faster stock removal . . . better finish . . . more pieces per dressing . . . longer wheel life . . . easier dressing, with less wear on diamond or on roll.

Added up, all these advantages mean valuable production economies and improvements in your product. That's why G Bond users have been glad to show their appreciation — with a steady stream of endorsements like those shown here.

Your Norton Distributor

is ready with proof of how G Bond wheels can add the work-speeding, profit-increasing "Touch of Gold" to your own cylindrical or centerless grinding jobs. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your classified 'phone directory. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

W-1576

*Making better products . . .
to make other products better*

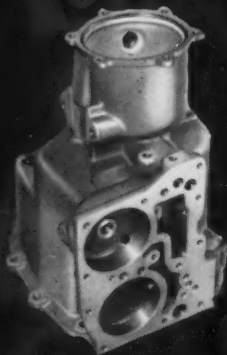
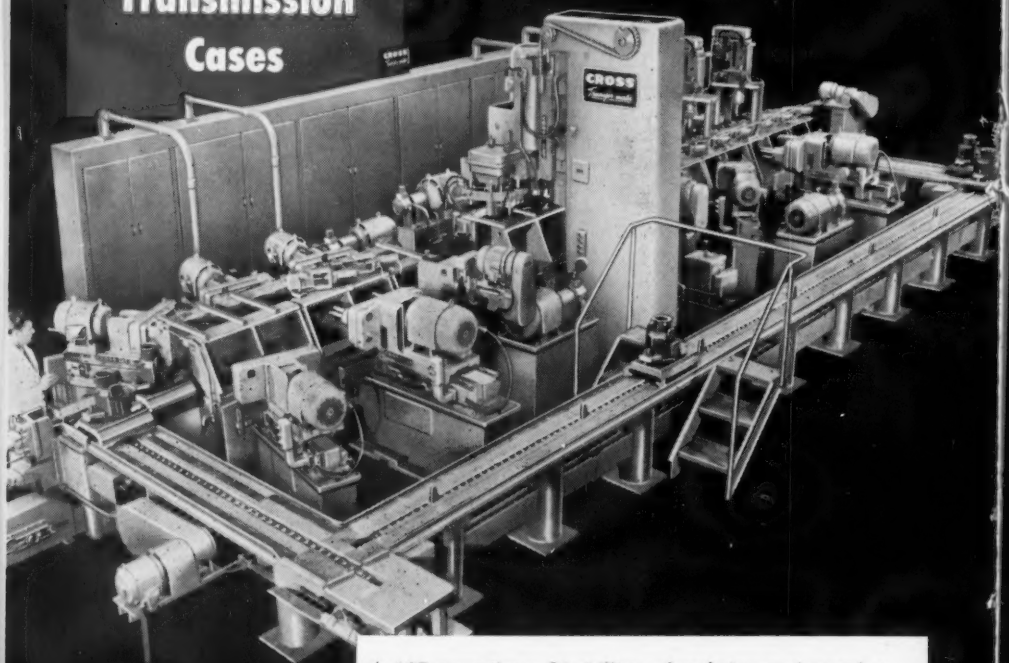
NORTON

and its BEHR-MANNING division

NORTON: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

**Drills, Bores,
Reams and Taps
Transmission
Cases**

Another Transfer-matic by Cross



- ★ 107 operations: 84 drilling, chamfering and reaming, 8 spotfacing and counterboring, 4 boring, 6 tapping, 5 inspection.
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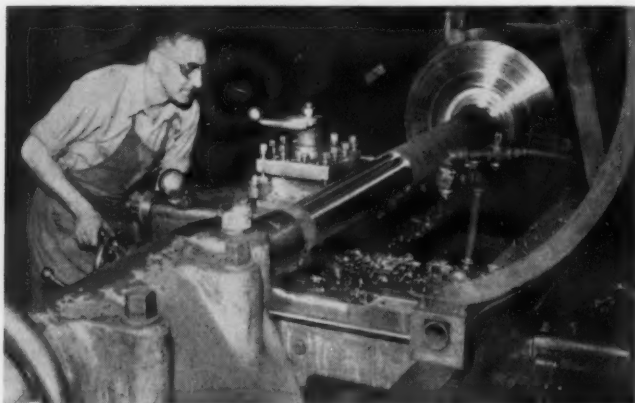
Machining Jet Engine Turbine Wheel Shafts

AT the Lynn River Works of General Electric Company, shifting to a new cutting tool in machining jet engine turbine wheel shafts did four things: (1) eliminated the use of a special spring-loaded quill that cost \$1500; (2) stopped the heat treated steel forging from elongating; (3) increased tool life by at least 40 per cent; and (4) reduced tool grinding time over 50 per cent.

The job at Lynn consisted of machining the J-47 engine part on a 40

h.p. 36-inch lathe without coolants. Normal operation called for first rough turning the entire 4340 steel, 5 3/4-in. diameter forging, which was scaly and had a Brinell hardness ranging from 269 to 321, and then repeating the operation with a finishing cut. In the roughing operation, the diameter of the forging was brought down to 4 1/2 in., with the depth of cut in the whole operation varying between 3/8 and 3/4 inch.

Formerly, two cemented carbide cutting tools were employed to complete the job. One was used for roughing and the other for finishing. Now, the entire job is done with one cemented carbide tool—the new ce-



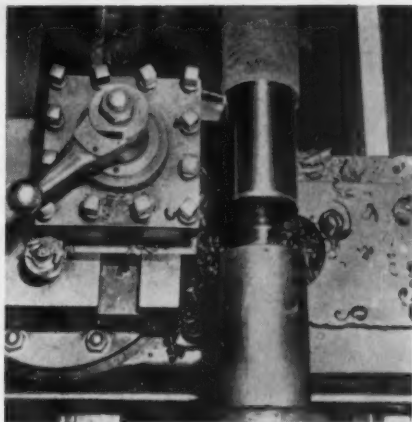
The first operation in machining jet engine turbine wheel shafts at the Lynn River Works of General Electric Company is roughing. Here a heavy-duty steel cutting carbide, Carboloy grade 370, is being used to cut through heavy scale on the 4340 steel shaft. The same tool is used for finishing.

mented carbide grade 370 developed recently by Carboloy Department of General Electric Company.

The carbides used previously during the operation not only were in the grinding room constantly but also ran at red heat, estimated around 1700 deg. F. The heat generated by the cutting action caused the shaft to elongate as much as 3/16 in. which caused the ball bearings centered in the quill to seize. In addition, tool breakage on this job was heavy—about 5 to 6 tools per week at \$8.00 per tool. To counteract this situation, a special spring-loaded quill was devised to keep the work from freezing on center.

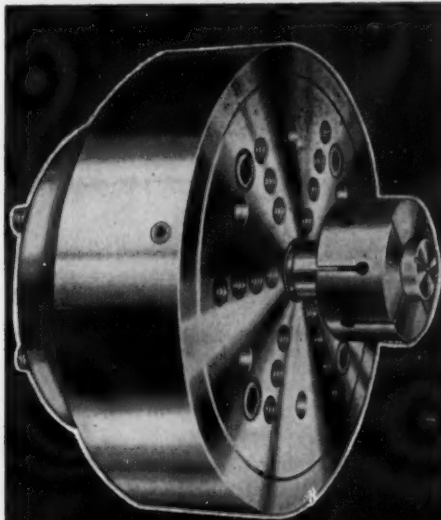
With the application of Carboloy carbide grade 370, both red heat and shaft elongation no longer were problems. Neither was it necessary to depend on a special quill to keep product quality up to specifications.

The carbide tool used includes a chip breaker and operates at a speed



Looking down on roughing operation in machining jet turbine wheel shaft. Note the spring loaded quill which was previously a "must" before Carboloy grade 370 was used. The lathe used is powered by a 40 h.p. motor.

of 200 s.f.p.m. with a feed of 0.018 in. Even though today the same cutting tool is employed for both roughing and



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(100 x) shows steel particles which passed through an edge-type strainer with .003" spacing. The particles were extracted by a Frantz FERROFILTER installed in the headstock lubricating oil line of a W & S No. 5 turret lathe.



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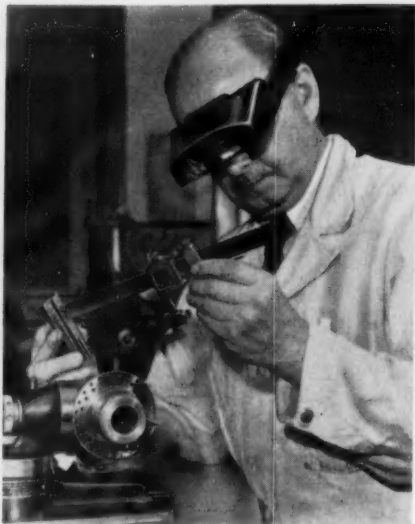
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finishing operations, it is running three times as long as the former carbides used—without tip deformation. The only regrinding it requires is a slight touch up from time to time, rather than a full grind.

Binocular Magnifier Simplifies Fine Calibration Reading

AT Western Electric's Kearny, N. J., works, a "Magni-Focuser," the 3-D binocular magnifier manufactured



Worker in mechanical laboratory at Western Electric's Kearny, N. J., works is shown using a 3-D binocular magnifier to read fine calibrations on a height gage.

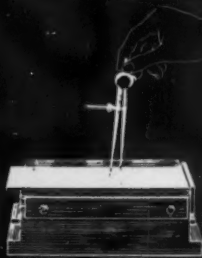
by Edroy Products Company, is used in the mechanical laboratory for reading fine calibrations. Magnified vision in third dimension as provided by the device ensures maximum accuracy and speeds up precision work. It allows for the free use of both hands and can be worn with or without eyeglasses.

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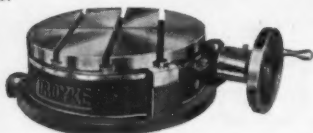
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Cutting production time on multiple spindle, semi-automatic drilling machine is accomplished through the use of these two Speed Vises working side by side.

single unit. For multiple spindle, semi-automatic drilling machines, the use of two or more Speed Vises is said to enable the operator to complete multiple drilling operations without the use of expensive jigs and fixtures. In addition, the quick action of the Speed Vise units reduces operating time, thus saving man-hours on each job.

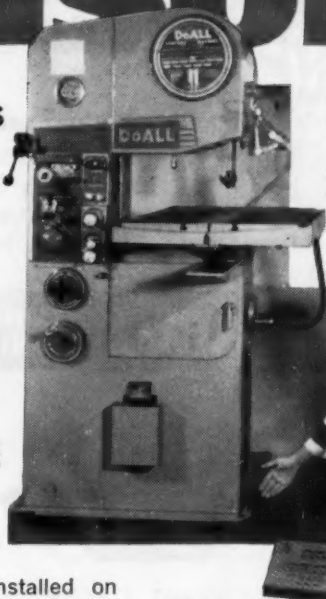
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INTERRUPTED cutting of hard, tough, heat-treated S.A.E. 4340

alloy steel forgings is currently being accomplished at an increased speed and with over ten times longer tool life by Kennamatic sintered tungsten carbide triangular insert tooling. This operation, performed at the Menasco Manufacturing Co., Burbank, Calif., maker of aircraft landing gears, consists of rough and finish facing both sides of a star-shaped 11-in. diameter forging on a 10-h.p. Warner & Swasey No. 24 turret lathe.

Standard Style TFR-16A, Grade K5H triangular insert tools are used for the rough cut at 101 r.p.m. 290 s.f.p.m., and for the finishing cut at 134 r.p.m., 385 s.f.p.m. This is one and one-

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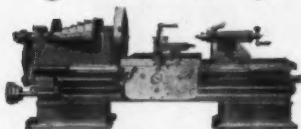
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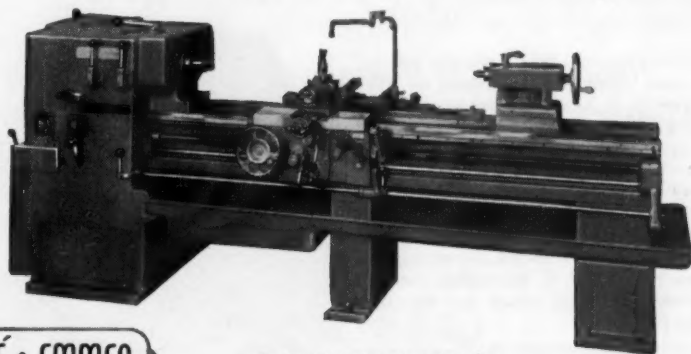
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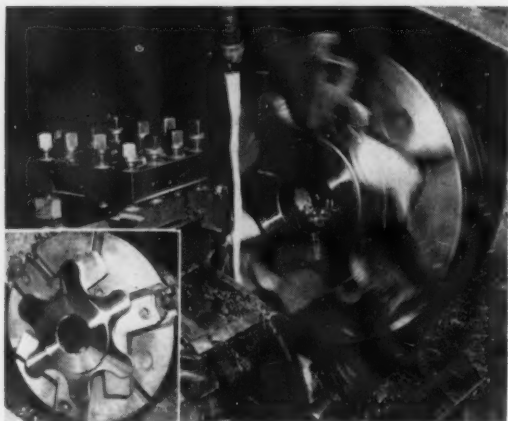
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Severe interrupted facing cut being made on 11-in. diameter steel forging (S.A.E. 4340) with Kennamatic triangular insert tool, Grade K5H. Inset shows irregular shape of forging.

three cuts formerly necessary. The depth of cut on roughing is 0.030 to 0.125 in. and 0.030 in. on finishing. Under these stepped-up operating conditions, nine pieces are machined before any indexing is required. Since three cutting edges are available on each end of the triangular insert, both sides of

half times greater speed than the shop was previously able to use. The feed used is now 0.0075 in. per revolution—twice that previously utilized. Only two cuts are required for each face of the workpiece, as against the

54 pieces are faced before regrinding of the tungsten carbide tool is necessary. Cimcool coolant is used in this operation.

Changing time for the previously-used tooling was 6.35 minutes. The

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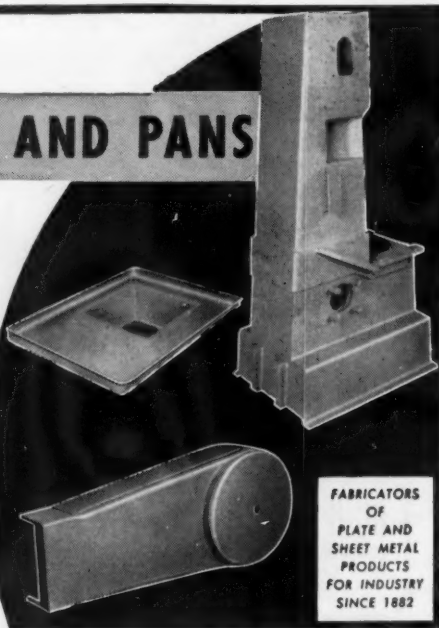
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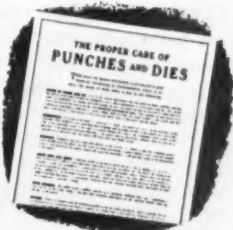
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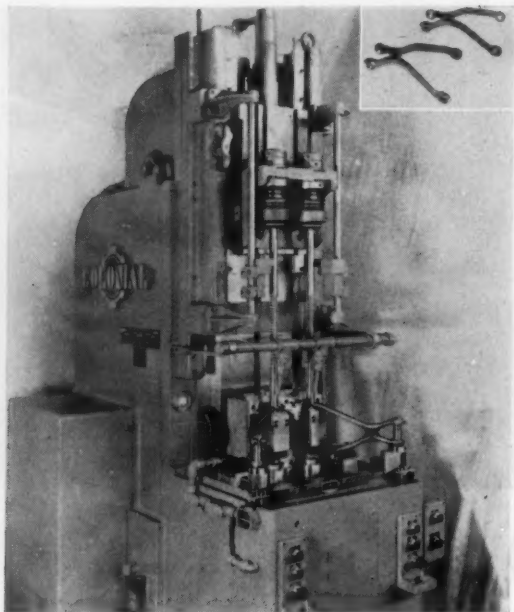


Illustration showing two-station broaching machine with parts (knuckle supports as more clearly shown in inset) clamped in unique dual fixture and broaching tools poised for downward stroke. Note that the cam on the main ram slide is engaged with the fixture actuating arm. In this position, the clamping of the part is nearly completed.

time for indexing or rotating the triangular carbide insert tool to a new cutting edge is now only 45 seconds.

Production of Knuckle Supports Doubled with Two-Station Broaching Machine

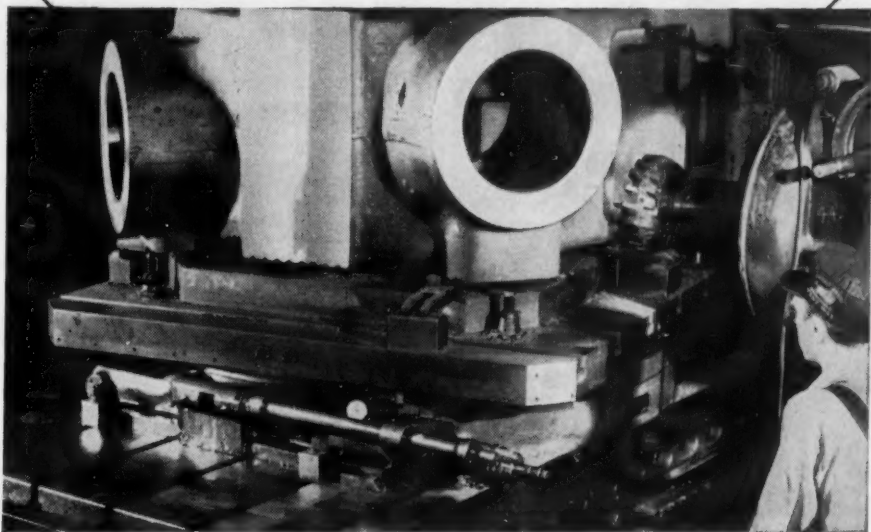
TWO pull-down broaching tools have been adapted to a single standard broaching machine with a single clamping and locating fixture for the purpose of broaching two parts at a time. The machine with a 6-ton capacity and 42-in. stroke and the tools and fixture combination are products of Colonial Broach Co., Detroit.

The operation involves the broaching of two internal serrations in each of two automobile suspension upper knuckle supports during one downstroke of the machine's ram. Both sets of internal serrations are broached on

the same center line in a straight through pass of the broach. The simple clamping and guiding fixture used is designed to allow over 300 parts per hour to be broached at 100 per cent efficiency. Loading and unloading of both parts requires only 15 seconds. The loading portion of the fixture consists of two vertical locating pins over which the opposite ends of the X-shaped part are placed. Clamping is achieved mechanically as a cam on the main ram slide engages an arm on the fixture that is linked to expanding jacks or wedges. Unclamping is achieved in the same manner after the broaches have completed their stroke. The wedging action of the fixture rigidly supports the two cantilevered arms, thereby resisting the high broaching loads as the tool passes through the holes.

Fixture and machine controls are electrically interlocked for safety. Completed knuckle supports are removed with the broaching tools in the downward position. The tools then return at the rate of 60 f.p.m. and the operator places two more parts in the fixture. The interlocking system guards against downward broach movement until the knuckle supports are located and clamped in the fixture and the operator's hands are out of danger. The cutting stroke rate is 30 ft. per minute.

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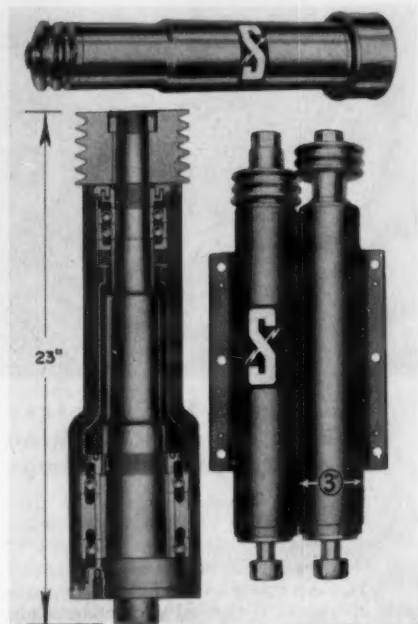
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(Right) Tandem precision spindle assembly designed to solve cutting problem for aluminum casting manufacturer. (Top) Spindle designed for incorporation in grinding machine. (Left) Cutaway view showing rugged spindle and ball bearing design.

hole centers. The tandem precision spindle assembly shown at the right in the accompanying illustration achieved this result. Each unit has a housing diameter of 3 in. and a two-groove sheave which is powered by a $7\frac{1}{2}$ h.p. motor with a four-groove sheave.

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The spindle shown at the top in the illustration was designed for an original equipment manufacturer for incorporation in grinding machines. The cutaway view at the left shows the rugged spindle and the ball bearing design which provides for maximum radial and thrust loads. The versatile spindle serves either as a grinding spindle or a work head. Every Standard spindle is dynamically balanced.

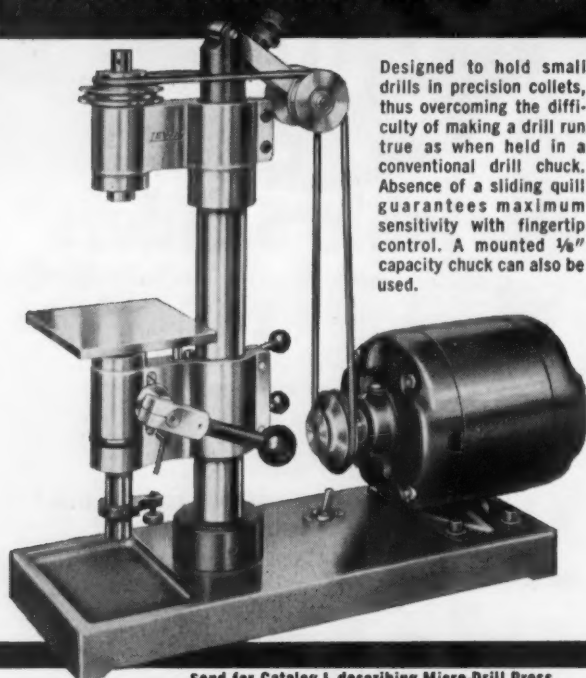
Simple Brushing Operation Cuts Rejects by 12 Per cent

A SIMPLE brushing operation now being performed at International Harvester Company's Louisville Works automatically removes the chips from the broaching bar cutting internal splines in steel bull gear forgings. This brushing operation has reduced part rejections by 12 per cent and has considerably increased broach life.

Prior to adapting brushes to this job, the broaching bar would quickly load up with chips, causing rough and inaccurate splines. The machine operator was paid on a piece basis and received no penalty for rejects. The net effect was a 12 per cent rejection rate because of "runouts" — the tendency of the gear to runout of alignment with the splines.

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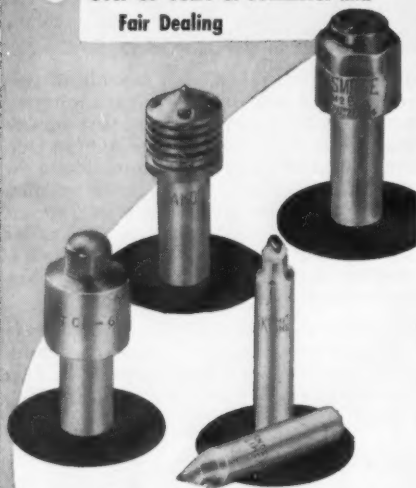
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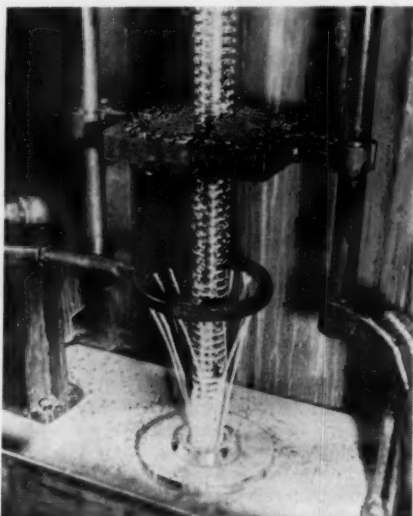


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holder mounting four brushes is used for the spline-broaching job. The four brushes are so mounted around the broaching bar that the bar is surrounded by wire bristles. The brush bristles are 0.005-in. steel wire, 2 in. long, used in 3-in. strips. The width of the brush face is $\frac{1}{4}$ inch. This installation was developed by International Harvester with the cooperation



The brushing fixture is shown just above the coolant ring. The continuous coolant flow removes some chips; however, brushes do the biggest part of the chip-removing job. The illustration shows the machine in the upstroke. Most of the chips are removed on the upstroke; those remaining are brushed off on the down or power stroke.

of The Osborn Manufacturing Company, manufacturer and designer of power brushes.

Valve Parts Inspection Problem Solved with Unique Setup

THIS article explains how Norton Co., Worcester, Mass., solved a problem in inspecting hydraulic valve

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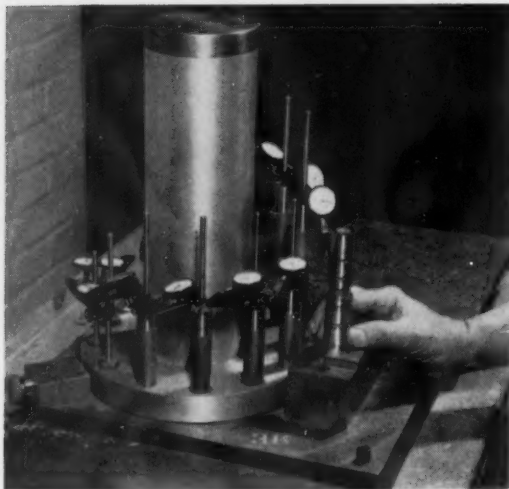
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The inspection of 11 surfaces on a cylindrical valve part is quickly accomplished using Federal indicators on this rotating fixture designed and used by Norton Company.

chine. The usual inspection methods were found to be time consuming for this particular job.

Norton inspectors and engineers devised a quick setup, consisting of a precision turntable with eleven Federal dial indicators mounted on the periphery at heights corresponding with the groove locations. As the table is turned, the indicators bear on each surface in succession. Inspection time per piece has been cut drastically with this setup.

parts. The job consisted of checking the location of grooves in a cylindrical valve part for a precision grinding ma-

chine. The usual inspection methods were found to be time consuming for this particular job.



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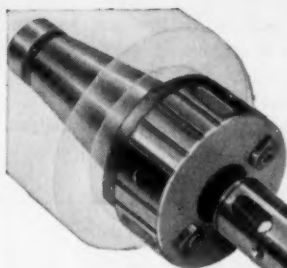
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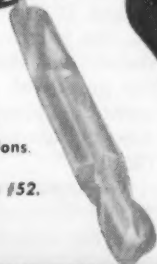
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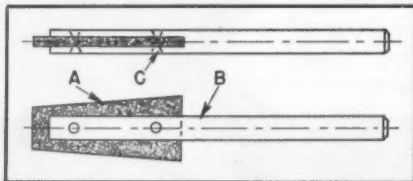
ideas from readers

Easily-Made Brushing Tool for Taper Sockets

By ROGER ISETTS

WHEN frequently changing tools in a taper shank socket, considerable damage or misalignment of the tool can be caused if even a small chip or piece of foreign material is lodged in the socket without the knowledge of the operator. The accompanying sketch shows a simply constructed tool which can be inserted in the taper shank hole after removing tools for the purpose of cleaning the hole out quickly yet completely.

Extremely handy for toolmakers or machinists who must frequently change cutting tools or mandrels, the device comprises a piece of felt, **A**, approximately $\frac{1}{8}$ inch thick, which is



Sketch of simply constructed tool for quickly cleaning out taper shank sockets

cut with a slight taper and inserted in a slot cut in the end of a wooden rod, **B**. The felt strip is held firmly in place in the wooden handle by means of rivets, **C**.

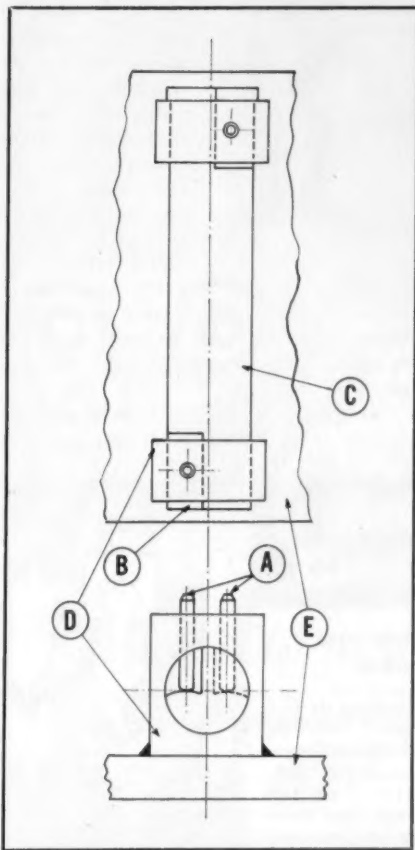
Simple Equalizer for Locating Purposes

By JOHN ROGERS

PARTS with rough surfaces, when located in machining fixtures, should always be rested on three points. Occasionally, it occurs that a part is of such shape that it becomes necessary to rest the part on four points. If four fixed points are selected, the part will rock, and designers, therefore, usually specify that one of the points be adjustable. The adjustment, however, is time-consuming and does not always position the part correctly.

To overcome this condition, the rocker-equalizer shown in the accompanying sketch was designed. The part rests on two fixed buttons (not shown) and two equalizer buttons, **A**. When the work is placed onto these four buttons, one of the movable buttons will make contact first, thereby being pushed downward. In doing so, the lower

end of the button exerts pressure on the milled-out portion **B** of equalizing rod **C**, which will rotate somewhat. This rotation, in turn, forces the other equalizer button upward until it makes contact with the workpiece. Uprights

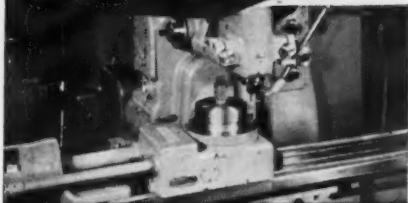


Sketch showing simple rocker-equalizer for quickly locating parts with uneven surfaces

D on jig base **E** provide bearings for the equalizer rod **C**. The pins **A** can be designed to permit adjustment.

Contrary to many other equalizing methods, this one is simple, positive, and can be used to span long distances.

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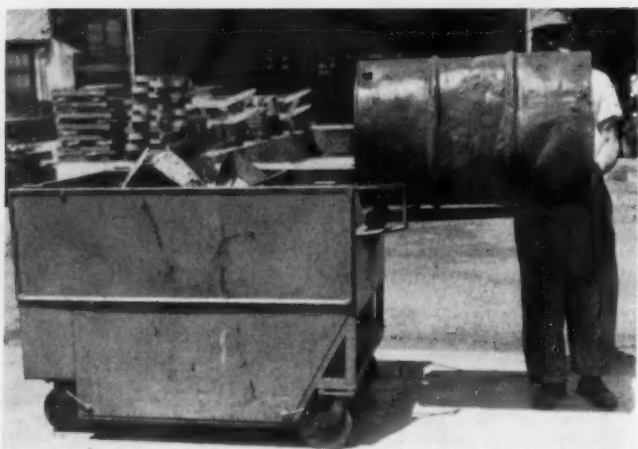


Fig. 1 — Refuse collector with convenient barrel dumping device

Handy Refuse Collector

By H. G. FROMMER

WITH 22 trash barrels distributed throughout the shop area, it took one man over four hours to empty

barrel loads, the job was reduced to three circuits with a total walk of one-half mile. Time savings amounted to 75 per cent.

Referring to Fig. 1, the refuse collector is provided with a top cover

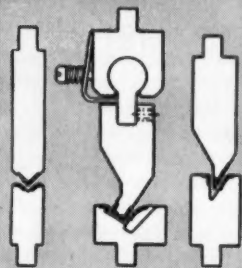
them by carting, one at a time, to the incinerator. Moreover, he walked over two miles while doing this chore. After construction of the refuse collector illustrated herewith, which has a capacity of more than seven



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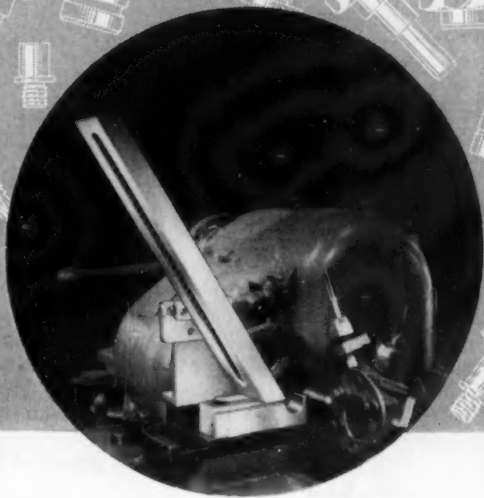
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Fig. 2—Close-up view of refuse collector showing barrel dumping device in normal position

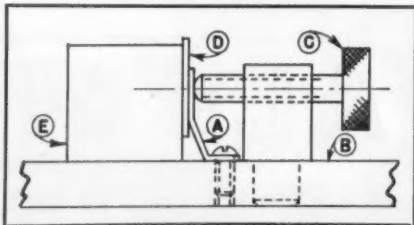
(for wind and fire protection) and with a side cover. The latter can be locked in open position to permit removal of contents by shoveling. Note barrel dumping device beneath barrel. Fig. 2 shows the barrel dumping device in normal position. The barrel rim slips behind two small lugs against the upright. A foot-operated brake to hold the collector on slopes and during dumping is provided near the upright.

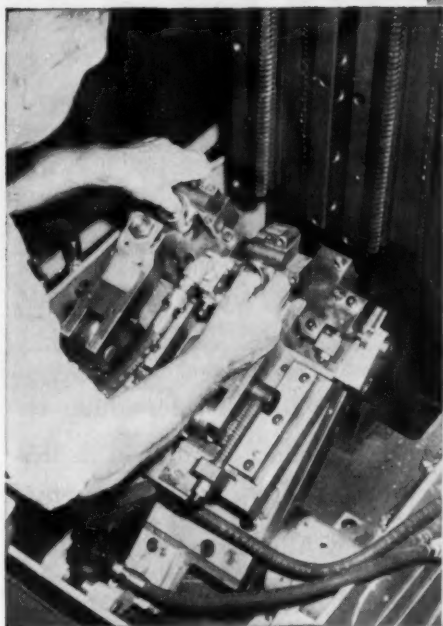
Spring Steel Clamp

By F. C. ELMO

THE accompanying sketch shows an easily made work-holding clamp which is designed so as not to mar the

Sketch of easily made spring steel work-holding clamp



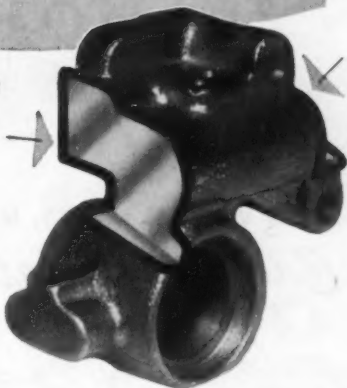


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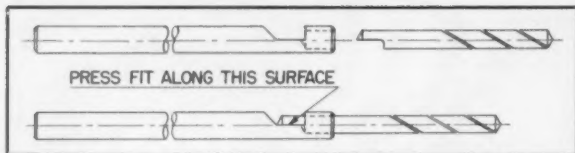


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Sketch of simple extension drill adaptor

workpiece being held. A piece of formed spring steel, **A**, is fastened to the base of the fixture **B**. A knurled head screw, **C**, is used to force the spring against the workpiece **D**, thereby holding the workpiece firmly against the support block **E**.

Many variations of this simple design can be used in a machine shop to meet unusual clamping requirements.

Extension Drill Adaptor

By **FREDERICK BARKER**

THE simple extension drill adaptor shown in the accompanying sketch was devised by the writer for the pur-

pose of eliminating the sweating or brazing of the drill into the extension, as was formerly done. With this adaptor, the drill can be easily inserted or removed with only a light tap on either end and without even removing the adaptor from the drill chuck.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.

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news of the industry

Omer E. Robbins Company Moves into New Plant

Omer E. Robbins Company has moved into a new, modern one-story plant and office located at 24800 Plymouth Rd., Detroit, Mich. Situated on a 6-acre site, the new quarters provide 14,000 sq. ft. of manufacturing area and 2,500 sq. ft. of office space. The expanded facilities are said to enable Robbins to meet increased demand for its Magna-Sine, sine plate and other precision products, as well as to offer these products in larger sizes. Many modern conveniences have been incorporated in the new structure. A 40-ft. crane travels the full depth of the working area for quick, easy material movement. Window placement, air conditioning and modern lighting improve working condi-

tions and contribute to greater precision and efficiency. The new building also makes it possible for Robbins to expand its line of precision equipment to include special jigs, fixtures, build-up gages and special machinery.

Skee Tool Company Purchases Anthony Tool Company

The Skee Tool Co., 1406 N. Flores, San Antonio 1, Texas, has announced the purchase of what was formerly the Anthony Tool Company, maker of the Anthony Cutting Off Tools. The Skee Tool Company will continue to manufacture the complete line of Anthony Cutting Off Tools, which are available in various models for use on both engine lathes and turret lathes.



New, modern plant of Omer E. Robbins Co., Detroit, Michigan

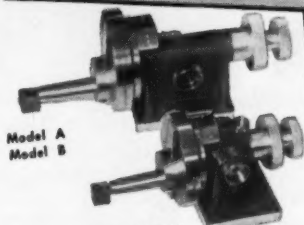
G & L to Exhibit at Fourth European Machine Tool Exposition

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., plans to exhibit four machine tools at the Fourth European Machine Tool Exposition scheduled to be held in Milan, Italy, September 14-23, 1954. The machines to be exhibited include a 48 in. x 43 in. x 22 ft. Hypro Double Housing Planer; a Model C 300-T Table-Type Horizontal Boring, Drilling and Milling Machine; a 30 Series Table-Type Horizontal Boring, Drilling and Milling Machine; and a 50 Series Floor-Type Horizontal Boring, Drilling and Milling Machine. Features of the double housing planer include renewable T-slot inserts, hydraulic table stops and jacks, dual rail control, power cross feed to side heads, centralized saddle control, electric rail clamp and precision adjustment handles. The width between housings is 49½ in., the height under the rail is 43 in. and the table is 22 ft. long. The machine is equipped with a maximum high speed range in excess of 300 ft. per minute.

The Model C 300-T machine utilizes an automatic positioning device for table and headstock to assure precision settings on a wide variety of applications. This machine has a 3-in. spindle with 24 in. of longitudinal travel, together with 48 in. of headstock travel. The machine is complete with saddle supports and over-the-floor type auxiliary runways. A 10-h. p. motor powers the machine.

The 30 Series machine is equipped

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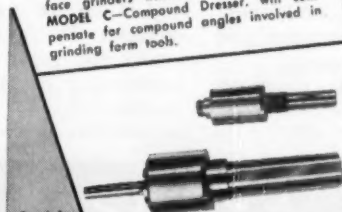


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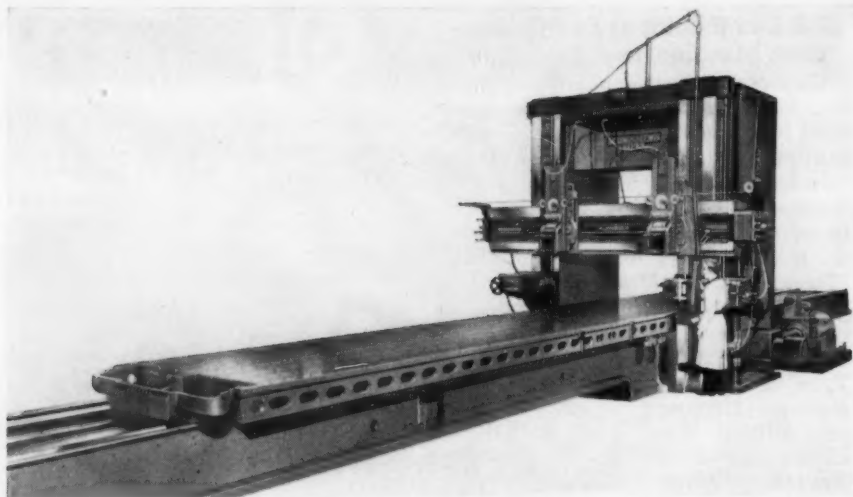
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This G & L Double Housing Planer is one of four machines to be exhibited at the Fourth European Machine Tool Exposition

with a built-in rotary table with power drive to rotate heavy or unwieldy pieces. Features of this machine include 5-in. diameter spindle with 36 in. of longitudinal travel; 36 standard spindle speeds in r.p.m. fine geometric progression from 7.5 to 467 and nine high speed spindle speeds from 382 to 975; and 36 separate spindle feeds. The machine is equipped with saddle supports and over-the-floor type auxiliary runways and is powered by a 25-h.p. motor.

The 50 Series machine, equipped with an underarm, features 7-in. main

spindle with 60 in. of longitudinal travel and a 2.5-in. auxiliary spindle with 15 in. of longitudinal travel; 21 main spindle feeds and 18 auxiliary spindle feeds. An underarm extended spindle support, providing the spindle rigid support its full length of travel, is used in conjunction with a continuous feed facing head, right angle milling attachment and faceplate drive attachment. This machine is equipped with a 2-ton crane for fast, efficient lifting and positioning of the underarm attachments.

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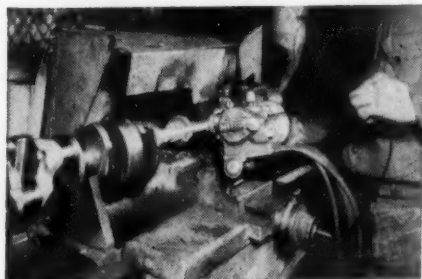
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C. R. Alden Honored by A.S.M.E.

The American Society of Mechanical Engineers recently made Carroll R. Alden, research and patent engineer, Ex-Cell-O Corp., Detroit, Mich., a Fellow of the Society, an honor conferred on men whose contributions in the field of engineering have been outstanding. Mr. Alden was graduated from Ohio Northern University where he received degrees in electrical and

mechanical engineering. He taught at the Detroit Institute of Technology prior to entering naval service in 1918. Mr. Alden returned to the Detroit Institute of Technology as dean of the Trades and Technical Schools, later going to Ohio Northern University as dean of the College of Engineering.

Mr. Alden joined Ex-Cell-O in 1923. Here he was instrumental in develop-

ing several well-known Ex-Cell-O products, such as precision ball bearings, precision grinding



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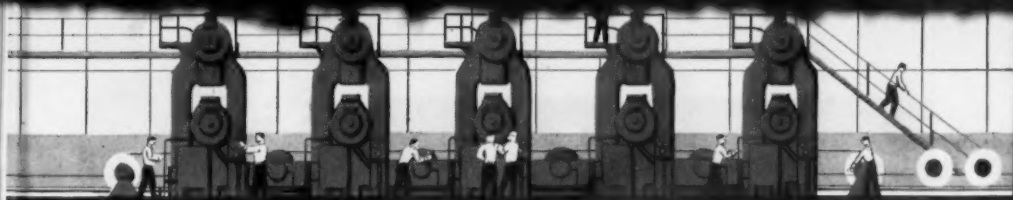


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spindles and precision boring machines. Mr. Alden has been a member of the A.S.M.E. since 1927. He has been active in local chapters and has contributed articles to the technical press. Last year he received an award for an outstanding technical paper on Electrosark machining.



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(Left to right) C. W. Simpson, executive vice president; Albert E. Henn, machinery division sales manager; and F. H. Chapin, president of National Acme Co., Cleveland, Ohio

A. E. Henn Completes 50 Years of Service at National Acme

At an informal meeting held recently at National Acme Co., Cleveland, Ohio, F. H. Chapin, company president, presented Albert E. Henn, sales manager of the machinery division, with a diamond-studded pin for 50

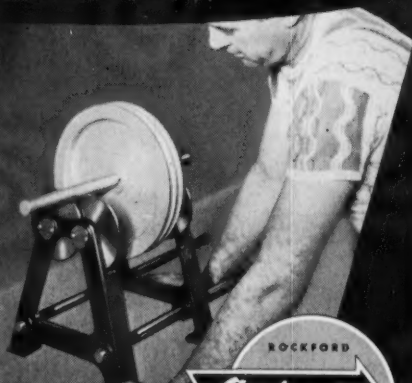
years of continuous service with the company. Mr. Henn joined National Acme in 1904 upon graduating from high school. Two years earlier, his father, E. C. Henn, co-inventor of the first successful multiple-spindle automatic turret lathe, had been one of the founders of National Acme Manufacturing Company in Cleveland. Mr. Henn started in the billing department, worked in cost, factory supervision and pay offices and finally wound up in sales in 1916. He was in charge

PRECISION BALANCING WAYS

Save Time . . . Cut Cost

Balance rotating parts easier, faster, more accurately with supersensitive Anderson Balancing Ways. No setup, no leveling, no centering. Chilled iron discs, ground and balanced to extreme accuracy, rotate with minimum friction on special bearings. Glass-hard spindles and bearings prevent wear or ball-bearing indentations when balancing heavy weights. Superior accuracy lasts throughout long life. Proved and preferred 38 years. Write for bulletin 8-22.

Swing	Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000



ANDERSON BROS. MFG. CO., ROCKFORD, ILLINOIS



Specify Adams

for high quality gears
made **EXACTLY** to
your specifications

Regardless of quantity or type, you'll profit by specifying Adams custom made gears for your product. Made on the most modern gear cutting machines by skilled workmen, Adams gears are quality controlled to guarantee exact conformance to your specifications. Write today for further information. THE ADAMS COMPANY, 1942 Cypress Street, Dubuque, Iowa.

The ADAMS Company
Dubuque, Iowa, U. S. A.
ESTABLISHED 1883

FINE GEARS MADE TO
YOUR SPECIFICATIONS



of foreign sales for the company from 1918 to 1936 when he became machinery sales manager.

Starrett Advertising Wins Recognition from Industrial Distributors

An award for advertising excellence was presented to The L. S. Starrett Co., Athol, Mass., by the National Industrial Distributors' Association and

the Southern Industrial Distributors' Association, meeting jointly at the Triple Industrial Supply Convention held recently in New York City. The

Standardize on

hall COLLET CHUCKS

for
SPEED,
ACCURACY,
ECONOMY



Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments. All grip ...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

SATISFACTION GUARANTEED!

Made in Two Sizes to Fit Your Requirements:
Model A...1" (max. capacity 1-1/16")
Model B...2" (max. capacity 2-1/16")

Round, square or hexagon collets, plain or serrated
No. 3 Collet Pads Now Available

Write today for illustrated catalog and price list—Dept. B-8.

HALL MANUFACTURING COMPANY
827 TULAREDA DRIVE, LOS ANGELES 26, CALIFORNIA



Advertising award presented to The L. S. Starrett Co., Athol, Massachusetts

award was for the best series of two or more direct mail pieces stating two or more benefits to users buying from industrial distributors. This award is the second highly significant award for excellence in advertising won by Starrett this year. Previously, the Associated Business Publications presented an award to the company for the effective use of advertising in industrial, institutional and professional publications during 1953.

Specify DESTACO SHIM STOCK



Made from selected steel or brass, rolled to precision limits, oiled to resist stain and rust, free from burrs. Twelve assorted thicknesses .001" to .015", sheets 6" x 12"; coils 120", identified every 6" by thickness and amount remaining on roll.

DESTACO DETROIT STAMPING COMPANY
349 MIDLAND AVENUE • DETROIT 3, MICHIGAN



How "ROCKWELL"* Hardness Testers Reduce Customer Complaints

• Surface hardening of wearing parts makes them last longer but it is a job requiring skill and precision. The eye cannot detect inaccuracies but a WILSON "ROCKWELL" hardness test leaves nothing to chance.

The WILSON "ROCKWELL" Hardness Tester is a precision instrument with totally enclosed "Zerominder" dial, grips/clamp screw for quick change and proper seating of penetrator, conveniently grouped controls, enclosed variable

speed dash pot, and standardized weights.

Regular and Superficial WILSON "ROCKWELL" Hardness Testers come in many styles with accessories for testing flats, rods, rounds, odd shapes.

There is the WILSON TUKON for micro-indentation hardness testing.

Write for literature.

*Trade Mark
Registered

ACCO



WILSON MECHANICAL INSTRUMENT DIVISION
AMERICAN CHAIN & CABLE

230-G Park Avenue, New York 17, N. Y.

**WILSON
"ROCKWELL"
and TUKON
Hardness
Testers**

Clarence Worthington Hamilton

Clarence Worthington Hamilton, public relations director and administrative staff member at The Sheffield Corp., Dayton, Ohio, died recently at 62 years of age in Little Current, Ontario. Mr. Hamilton joined Sheffield 11 years ago, leaving a post as public relations director for the Globe-Wernicke Company in Cincinnati. Before that

Clarence W. Hamilton

he had worked with the late John H. Patterson, founder of the National Cash Register Company in Dayton. For a time he was associated with the Firestone Rubber Company. In 1952, Mr. Hamilton was given a life mem-

bership in the American Ordnance Association. At the time of the membership award, Louis Polk, president of Sheffield, cited Mr. Hamilton for his ability to "get things done, to button things up."

Allegheny Ludlum Completes Expansion at Carmet Division in Ferndale

Allegheny Ludlum Steel Corporation has announced the completion of an expansion and improvement program at its Carmet Division plant in Ferndale (Detroit), Michigan. Floor space at the plant, located at 1500 Jarvis Street, has been increased by 100 per cent, and the company for the first time is now manufacturing all its carbide powder in its own modern plant. In addition to the construction of the powder plant, the total capacity of the division has been increased

Take **LESS TIME
MAKING SET-UPS!**

In making set-ups for tapping and reaming, you'll find it to your advantage to use Ziegler Floating Tool Holders instead of ordinary tool holders because they greatly shorten set-up time.

For example, with Ziegler Holders, it makes no difference if the work is out of alignment as much as $1/32"$ on the radius ($1/16"$ on the diameter). The machine will still turn out perfect holes because the Ziegler Holder is so designed as to correct the inaccuracy in set-up.

By reducing set-up time, the Ziegler naturally also reduces labor costs—something worth keeping in mind.



FLOATING HOLDER
for Taps and Reamers...

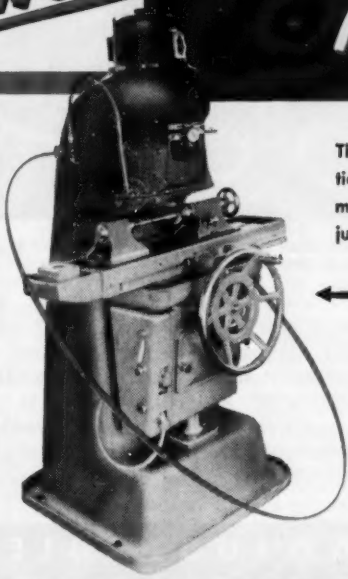
W. M. ZIEGLER TOOL CO.

13566 AUBURN
DETROIT 23, MICH.

**WRITE FOR
CATALOG**

NOW

IS THE TIME TO *Cut* Manufacturing Costs



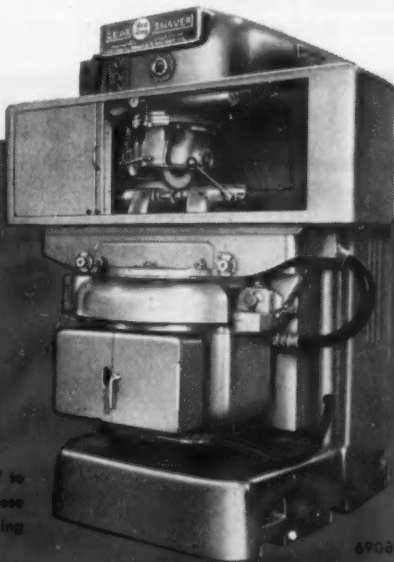
The one sure way of meeting today's competition is with today's machine tools. The older machines were all right in their day but they just haven't got what it takes now.

← For instance, it took this old Red Ring Model GCC 60 seconds to shave a gear like the one shown.



Model GCU today finishes that same gear in just 16 seconds—and to much closer tolerances, too.

In an 8 hour day the GCU will deliver 375% of the production of its predecessor.



Write for Bulletin S 83-7 to get all the facts on these new cost saving gear shaving machines.



SPUR AND HELICAL
GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING
AND ELLIPTICAL TOOTH FORM

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

by 50 per cent. Operation of the powder plant offers important advantages to the company's customers. Carmet is no longer dependent upon outside sources for its raw materials and is less vulnerable to production interruptions. Carbide powder production is carried on under exacting conditions of cleanliness and humidity control. In addition, the operation of a more completely integrated plant will offer more flexibility in the research and development of different carbide materials. The Carmet Division produces a full line of tools, blanks, die sections, drawing dies and special shapes and parts of carbide metals.

Special Lock Washer Service

Dayton Rogers Mfg. Co., Minneapolis 7, Minn., is now set up to produce special custom made die-cut lock washers in small lots without the cost

of conventional blanking and piercing dies. The special lock washers can be produced from practically any sheet

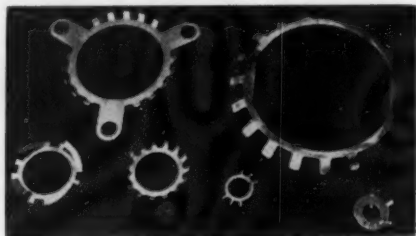
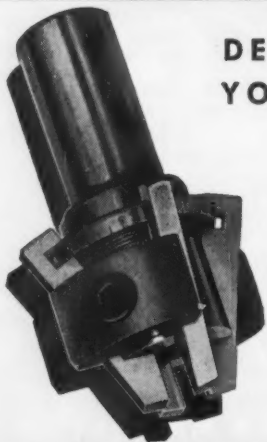


Illustration showing typical assortment of Dayton Rogers special custom made die-cut lock washers

metal stock, including cold rolled steel, spring bronze, spring steel and any other sheet alloy. Special lock washers for shaft sizes from $\frac{1}{8}$ to 6 in. are available for all equipment installations under this die stamping method.

KUTMORE ADJUSTABLE HOLLOW MILLS



DESIGNED FOR ALL YOUR HOLLOW MILLWORK

● ANY COMBINATION OF ... TURNING ... TAPERING ... FACING ... CHAMFERING ... TREPPANNING IN ONE PASS.

● EXCLUSIVE **MICROMETER** ADJUSTMENT FEATURE FOR RAPID SET-UP.

● CUTTING CAPACITIES FROM $\frac{1}{32}$ " TO 2" DIAMETER IN STANDARD STOCK. IMMEDIATE DELIVERY.

WRITE FOR CATALOGUE No. 20 MM

OUR ENGINEERING DEPARTMENT IS AT YOUR DISPOSAL ON YOUR HOLLOW MILL PROBLEMS

CARL WIRTH & SON, INC. 1625 CLINTON AVE. NO. ROCHESTER 5, N. Y.

SPECIAL TAPS!

...for Immediate Delivery

HIGH SPEED SPECIAL RIGHT HAND TAPS

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
4	32-48-60-64	3/8	12-16-18-20-27-28-32-36-40-48	1-3/4	8-10-12-14-16-18-20-24
5	30-32-36-48-80	7/16	12-16-18-22-24-27-28-30-32-36-40	1-13/16	8-10-12-14-16-18-20-24
6	36-40-48-56-60			1-7/8	8-10-12-14-16-18-20-24
7	32-40-48	1/2	12-14-16-18-22-24-26-27-28-30-32-36-40	1-15/16	8-10-12-14-16-18-20-24-28
8	24-30-36-38-40-44-48	9/16	16-20-24-27-28-30-32-40-48	2	4 1/2-8-10-12-16-18-20
9	24-28-32-40-48	5/8	12-14-16-20-24-27-28-32-36-40	2-1/16	12-14
10	28-30-36-40-48-64	11/16	11-16-18-20-24-27-28-30-32	2-1/8	12-16-20
12	20-28-32-36-48	3/4	9-11-12-14-16-20-24-26-27-28-32	2-3/16	12-16
1/16	20-24-28	13/16	10-14-18-20-27-32	2-1/4	4 1/2-8-12-14-16-18
1/64	60-64	7/8	10-12-16-18-20-24-27-28-32	2-5/16	12-18
5/64	36-48-72	15/16	8-9-10-12-14-16-18-20-24-32	2-3/8	12-16-18
3/32	48-56-60	1	10-12-16-18-20-24-27-32-40	2-1/2	8-10-12
7/64	48-56-60	1-1/16	12-14-16-18-20-24	2-9/16	18
1/8	32-40	1-1/8	8-10-14-16-18-20-24-32	2-5/8	12-16-20
5/32	32-36-40-48	1-3/16	8-10-12-14-16-18-20-24	2-3/4	16
9/64	36-40-48	1-1/4	8-10-14-16-18-20-24-32	2-7/8	8-12-16
11/64	36	1-5/16	12-14-16-18-20-24-32	3	8-16
3/16	20-24-32	1-3/8	8-10-14-16-18-20-24	3-1/4	8-12-16
13/64	32-36-42	1-7/16	8-10-12-16-18-20-24	3-1/2	8-12-16
7/32	24-28-32	1-1/2	8-10-14-16-18-20-24-28	3-7/8	6
1/4	18-24-26-27-30-32-36-40-48	1-9/16	18-20-24-36	4	8-12
5/16	16-20-22-27-30-32-36-40	1-5/8	5 1/2-8-10-12-13-16-18-20-24		
		1-11/16	10-12-14-16-18-20-24		



HIGH SPEED LEFT HAND TAPS

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
0	80	3/8	16-24-32	1-3/8	6-8-10-12-16-18-20-24
1	56-64-72	7/16	14-20-28	1-7/16	8-10-12-14-16-18-20
2	56-64	1/2	12-13-26-28	1-1/2	6-8-10-12-16-18-20
3	56	9/16	12-18-20-24	1-9/16	8-10-12-16-18-20
4	32-36-40-48	5/8	11-12-18-20-24	1-5/8	8-10-12-14-16-18-20
5	40-44	11/16	11-16-24	1-11/16	8-10-12-14-16-18-20
6	32-36-40	3/4	10-16-18-20	1-3/4	8-10-12-14-16-18-20
8	32-36-40	13/16	16	1-13/16	8-10-12-14-16-18-20
10	24-30-32-40	7/8	9-12-14-18-20	1-7/8	8-10-12-14-16-18-20
12	24-28-32	1	8-12-14-16-18-20	1-15/16	8-10-12-14-16-18-20
1/4	20-28-32	1-1/8	7-12	2	4 1/2-10-12
5/16	18-20-24-28-32	1-1/4	7-12-16-18		

LEFT HAND AND SPECIAL DIES IN STOCK

Prices on Application

New Sizes Added Frequently

NOTE:

Oversize taps. Special size reamers. H.S. extension drills. H.S. Taper length drills No. 1 to No. 60—Letter sizes A. to Z. Fractional sizes 1/8" to 1/2" 12" Overall 9" Flute length. H.S.S.S. aircraft drills 6" and 12" long.

We Specialize In High Speed Cutting Tools

SPECIAL PRICES TO DEALERS

WESTERN TOOL SUPPLY COMPANY

615-619 W. Randolph St., Chicago 6, Ill.

Phone: RAndolph 6-4113

MONTHLY BULLETINS AVAILABLE



Brown & Sharpe Launches \$5,000,000 Modernization and Retooling Program

Brown & Sharpe Mfg. Co., Providence, R. I., has announced that it is making "the largest single development and re-equipment appropriation in the company's history." In a letter sent to stockholders, the company's president, Henry D. Sharpe, Jr., disclosed that the directors of the corpo-

ration have approved an initial capital appropriation of approximately \$2,000,000 toward modernization and retooling of the company's automatic screw machine facility, located in the Providence plant. This is in addition to the company's customary capital appropriation for routine replacement and refurbishment. The figure announced to stockholders covers capital expenditures only and does not include an estimated \$3,000,000 worth of other development costs incident to implementing the program.

According to Mr. Sharpe, this capital appropriation is the first installment on a long range program. The bulk of the present capital appropriation, larger than the amount spent by Brown & Sharpe for new equipment for its entire plant in 1953, will be used only for the improvement of the machinery in the company's existing screw machine facility. Succeeding phases of the plan envision still further remodeling of the layout in the existing facility to afford better floor space utilization and work flow.

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Sensational NEW features

FOSTORIA LOCALITE

The Perfect Lighting Tool for Machine Assembly Inspection



**Directs
Light
Exactly
as Needed**



MODEL 2-WX-700
Overall Length 31"

\$812
Each
in std.
pkg. of 8
Less
\$10.50 ea.

Reflector—New bell-ventilated shape with $5\frac{1}{2}$ " orifice. Rotates 360°. Accommodates 100 watt A-21 or R-30 lamps. Also PAR-38, R-40, RS-40. Available with lens, if desired.

Arm Joints—New patented tension disc design. Easy, smooth action with only one hand. Available with 1, 2 or 3 arms.

Base—Universal for vertical or horizontal mounting. Also adaptable to outlet boxes. Collet revolves 360°.

Wiring—Medium screw porcelain socket. "T" rated toggle switch. 8 ft. POT-32 18-2 heavily insulated oil resistant wiring with molded plug.

Finish—Gray baked enamel. Reflector interior, high temperature White.

WRITE for complete catalog of Localite models for every industrial use.

**THE FOSTORIA PRESSED
STEEL CORPORATION**
Fostoria, Ohio

Localites available through
wholesalers everywhere



How Bullard
with two



Man-au-trol turret heads are gang-planed

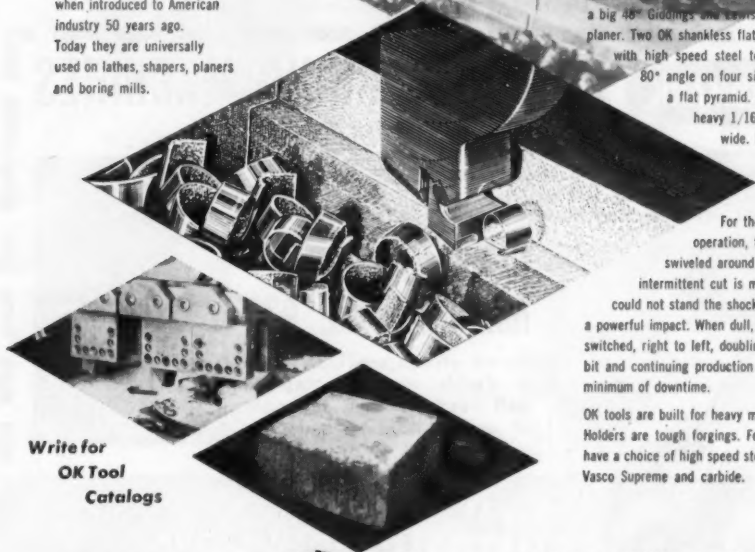
single point tools

The makers of OK single point tools originated the world's first system of inserted tool bits, preground, ready to use.



OK single point tools with their interchangeable tool bits were revolutionary when introduced to American industry 50 years ago. Today they are universally used on lathes, shapers, planers and boring mills.

Here forged Girders of SAE 1045 carbon steel, size 20 x 20 x 12" and weighing 1000 lb. are anchored into a slot to the base of a big 48" Giddings and Lewis 35 hp Hypro planer. Two OK shankless flat-nose tools with high speed steel tool bits cut an 80° angle on four sides, making a flat pyramid. Chips are heavy 1/16" depth, 3/4" wide. Feed, 40 ft./m.



For the second operation, the blocks are swiveled around and a rugged intermittent cut is made. Carbide could not stand the shock of such a powerful impact. When dull, tool bits are switched, right to left, doubling to life of the bit and continuing production with the minimum of downtime.

OK tools are built for heavy machining. Holders are tough forgings. For tool bits, you have a choice of high speed steel, cobalt, Vasco Supreme and carbide.

Write for
**OK Tool
Catalogs**

TWO COMPONENTS—
BODY AND
BLADES



**modern milling cutters
for modern milling machines**

THE OK TOOL CO., INC., Milford, New Hampshire

SPS Offers Spring Pins to All Company Dealers

Standard Pressed Steel Co., Jenkintown, Pa., has put its Sel-Lok spring pin products into the South, Southwest and West for the first time by going to national distribution. Previously handled by only eight exclusive dealers, the spring pin, a handy split steel tube for all kinds of assemblies, has been made available to distributors of other SPS products throughout the United States and Canada. There are 350 major SPS distributors and some 2,000 smaller ones. According to George A. Gade, vice president in charge of sales, the Sel-Lok line was offered to distributors because wider distribution was necessary to meet demands for the spring pin. James F. Regan, a spring pin specialist, has been assigned to provide engineering service on the product in the mid-west sales territory. Mr. Regan's headquarters will be in Detroit.

Potter & Brumfield Begins Building Expansion

Marking its fifth expansion in less than four years, Potter & Brumfield has announced the addition of a new 20,000 sq. ft. all-aluminum building to its main plant located in Princeton, Indiana. Construction is scheduled for completion around September 1, 1954. The building is of custom, modular or "add-a-unit" design, fitting the company's future expansion plans. It consists of two peak-roofed bays, each 50 x 200 ft., joined on the long edges and to which other similar bays can be joined in either of three directions. Main supports are at the ends and along the adjoining bay edges, thus affording a virtually unobstructed manufacturing area. Windowless, the structure will be completely insulated and cooled by fans changing the air completely 15 times every hour. Heating will be accomplished with a "Thermobloc" ductless system.

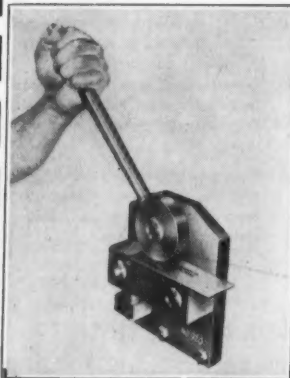
ACROMARK

POWER MARKING MACHINES

(SERIES 9A—POWER DRIVEN)

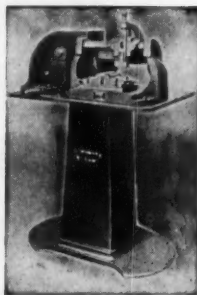
the last word for high production, high precision marking.
A powerful gear reduction motor does the driving. Clutch operated. Fast, smooth and quiet.

MODEL 9AMP—MOTOR DRIVEN, PEDESTAL MODEL SHOWN—→



HAND MARKING MACHINES No. 920

Shown at left are frictionless. A double row SKF precision ball bearing carries the plate or part as it passes under the roller die.



Write
for
Latest
Color
Folder

The
ACROMARK
Company

9 MORRELL ST., ELIZABETH 4, N. J.
"THE ORIGINAL MARKING SPECIALISTS"



JAW-HEAD



The best
"soft" hammer
your money
can buy!

Tough, resilient water buffalo faces deliver plenty of power with full protection for delicate parts and finishes. Faces are easily replaced, and comfortable Safety-Flare handle gives you non-slip grip. Work goes better with a C/R RAWHIDE Jaw-Head. See for yourself.

- Available from leading industrial suppliers.
Also C/R Rawhide mallets and Rawhide mauls.
For further information write Dept. 22



CHANGE FACES
IN SECONDS

CHICAGO Rawhide MFG.CO.

1301 Elston Ave. Chicago 22, Illinois

In Canada: Super Oil Seal Mfg. Co., Ltd., Hamilton, Ontario

Denison Announces New Aircraft Products Division

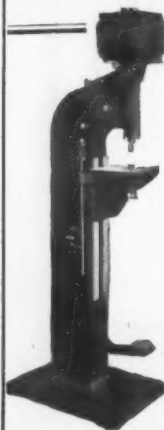
A new division of The Denison Engineering Co., Columbus, Ohio, to be known as the Aircrafts Products Division, has recently been established. The new division will sell, service and manufacture items for sale to the aircraft industry, both military and commercial. Edwin L. Shaw, a veteran of aircraft component development with

Denison, has been appointed head of the division. Roland N. Crossley is director of sales, and James Parr is



(Left) Roland N. Crossley and (right) Edwin L. Shaw

LINLEY noiseless RIVETING MACHINES



Cut time and cost in rivet spinning

These fast, sturdy, easily operated machines put your riveting on a production basis in terms of speed and low cost. We'll gladly demonstrate what they can do and the high quality of work they turn out. Send samples of your parts to be riveted and we'll give you time and cost estimates on handling your rivet spinning on a LINLEY. Sizes and types for iron and cold rolled steel rivets up to $\frac{3}{8}$ " ; larger capacity for rivets of softer materials.

Send today for bulletin R.

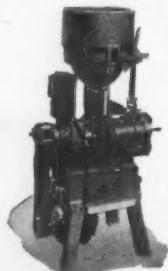
LINLEY BROS. CO.

671 State St. Ext., Bridgeport 1, Conn.

chief engineer. The principal products of the new division are the Denison variable volume aircraft pump, surge pumping valves, aircraft fluid motor and relief valve.

Brown & Sharpe Forms Three Additional Divisions

Brown & Sharpe Mfg. Co., Providence 1, R. I., has announced the formation of three additional divisions in its manufacturing organization at the Promenade Street plant. A. Dean Hunter, formerly works superintendent, has been named division superintendent of the Screw Machine Di-



for nut countersinking

Two KENT machines are available—the smaller for nuts up to $\frac{3}{4}$ " hexagon—the larger for nuts up to $1\frac{7}{16}$ " hexagon.

Hopper fed. Duplicate work spindles countersink both sides of nuts simultaneously giving fast, economical production.

Write for bulletin.

The KENT MACHINE CO., Cuyahoga Falls, O.

Drillers - Threaders - Sloters - Countersinkers - Bar Pointers

More than meets the eye

P-K Socket Screws, at a glance, may look substantially like those you buy from "habit." You have to "look beyond the hex" for the difference.

If you don't, you are buying with a "blind spot" that can block your way to *proved* benefits other buyers are using to advantage. Parker-Kalon's exacting Quality Control is only one of the advantages you don't see until you "look beyond the hex."

Look Beyond the Hex

Compare every detail of product and service. Compare for advanced design . . . for proved assembly strength . . . for buying aids, and supply service. Get all the facts, and try P-K Socket Screws. You'll find they take top rating in any test.

Get samples, information from your P-K Distributor, or write: Parker-Kalon Division, General American Transportation Corporation, 200 Varick Street, New York 14, N. Y.



Two of the many steps in the exacting P-K Quality Control routine are illustrated. Left, the metallograph test to check metal structure, and right, the Magnaflex inspection, employing "black light" to reveal any defects.



→ **FOR TOP QUALITY** and tolerance gaged to your most exacting specifications — and guaranteed.



→ **FOR ADVANCED DESIGN** that speeds assemblies — makes them simpler, stronger — and saves errors.

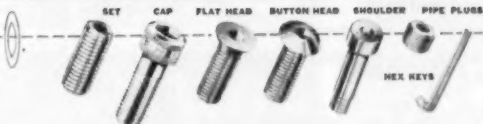
→ **FOR ASSEMBLY STRENGTH** okayed in a million punishing tests by thousands of satisfied users.

→ **FOR PLANNING AIDS** and buying data patterned to your special needs, plus advice on assembly.

→ **FOR SUPPLY SERVICE** set up for fast action and lower purchasing expense — by local Distributors.

→ **FOR ANY STYLE OR SIZE** You'll find any Socket Screw you need in P-K's complete line. Hex Keys in all sizes, and several handy sets.

PARKER-KALON SOCKET SCREWS



→ **GET ALL THESE ESSENTIALS OF COST-WISE ASSEMBLY**
GET P-K

In Stock . . . see your nearby P-K Distributor . . . your local Supply and Service Specialist



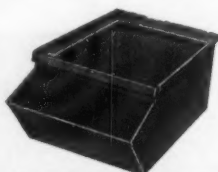
(Left to right) A. Dean Hunter, Frank E. Manchester and Frank A. Benoit, Jr.

vision, responsible for the operation of the division. Plans for the modernization of the facility were recently announced by the company. Frank E. Manchester was made division superintendent of a Central Services Division, uniting many of the company's important internal service departments. Frank A. Benoit, Jr., was named division superintendent of the

Foundry Division which includes the company's iron casting, cleaning and pattern-making facilities. The formation of the three additional divisions is a continuation of the program started by the company two years ago to bring executive talent in the organization closer to actual operations. These newly-created divisions are in addition to the Precision Tool and Gage Division organized almost two years ago, and the Metal Cutting Tool Division created several weeks ago.



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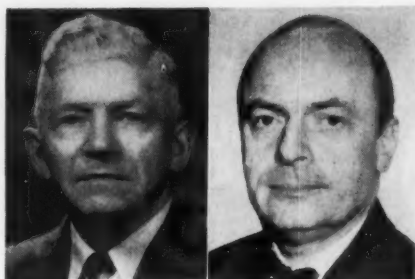
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MODERN MACHINE SHOP 231

Newly Formed Corporation Purchases K. R. Wilson

A newly formed corporation has purchased the machine tool and special automotive service tool business founded by the late Kirke R. Wilson in Arcade, New York. Officers and directors of the new corporation are principally members of the family and close associates of Mr. Wilson during his lifetime. The president will be Egon E. Rassow, prominent Buffalo exporter, who has handled export sales for the company since 1946. Frank C. Wilson of Arcade, brother



Frank C. Wilson (left) and Egon E. Rassow

of K. R. Wilson, will be chairman of the board and director of engineering for the corporation. Manly Fleischmann, Buffalo attorney and former Defense Production Administrator, will be secretary. Directors of the corporation, in addition to Messrs. Rassow, Wilson and Fleischmann, will be Anson F. Sherman, executive vice president of the Bank of Arcade, and James Gordon Devin, a Dunkirk, N. Y., industrialist who is a nephew of the late K. R. Wilson.

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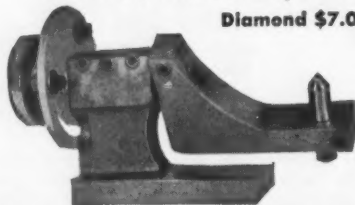
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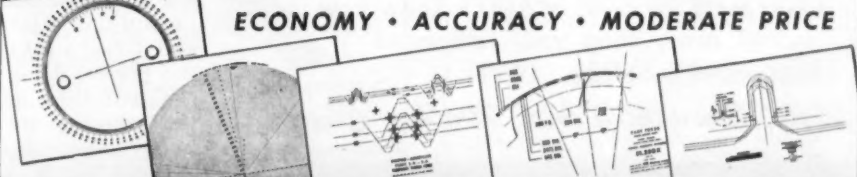
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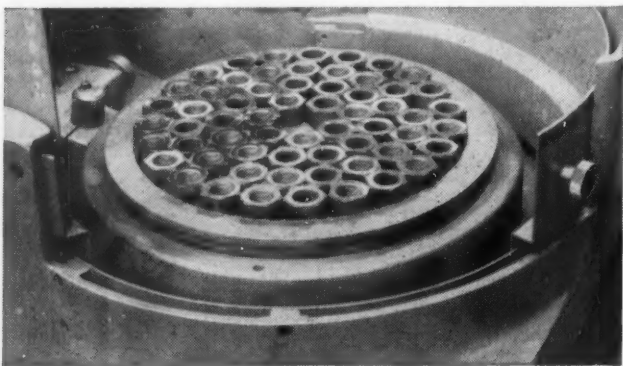
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200-MM LAFAYETTE ST. • NEW YORK 12, N.Y.

the executors of the K. R. Wilson estate, David D. Nash, Jack A. Ahern and the Manufacturers and Traders Trade Company, who have operated the firm since Mr. Wilson's death on September 25, 1948. The firm's administrative and sales offices, formerly at 215 Main Street, Buffalo, have been transferred to the modern plant at Arcade.

Maurice S. Dessau Company Moves to New and Larger Quarters

To serve its customers better, the Maurice S. Dessau Company, Incorporated, formerly located at 535 Fifth Ave., New York City, has moved to new and larger quarters in a modern office building which is situated at 589 Fifth Avenue, New York City.

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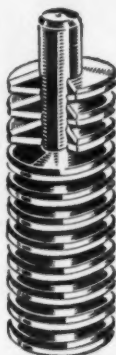
WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks



Stephen M. Dessau

plete line of industrial diamonds, diamond tools and diamond wheels, was subsequently headed by Simon Dessau and Maurice S. Dessau. At the present time, the activities of the company are being ably directed by a fourth generation of the Dessau family; namely, Stephen M. Dessau.



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Executive Changes Announced by Rem-Cru Titanium

C. I. Bradford, vice president and director of operations of Rem-Cru Titanium, Inc., Pittsburgh, has been appointed president of the company and a member of the board, replacing Walter U. Reisinger who has retired under the company's pension and retirement plan. R. S. Poister, vice president of Crucible Steel Com-



R. S. Poister (left) and C. I. Bradford

pany of America, has been elected chairman of the board of Rem-Cru Titanium, Inc., succeeding William H. Colvin who has retired from active business.

Ralph E. Cross Appointed Assistant Administrator of B.D.S.A.

Ralph E. Cross, executive vice president of The Cross Company, Detroit, has been sworn in by Secretary of Commerce Sinclair Weeks as Assistant Administrator of the Business and Defense Services Administration, U. S. Department of Commerce. Mr. Cross is on leave from his company, serving without compensation under a rotation system whereby outstanding businessmen and industrialists provide their services to the government for periods of six months or longer. He came to B.D.S.A. last February as director of the agency's

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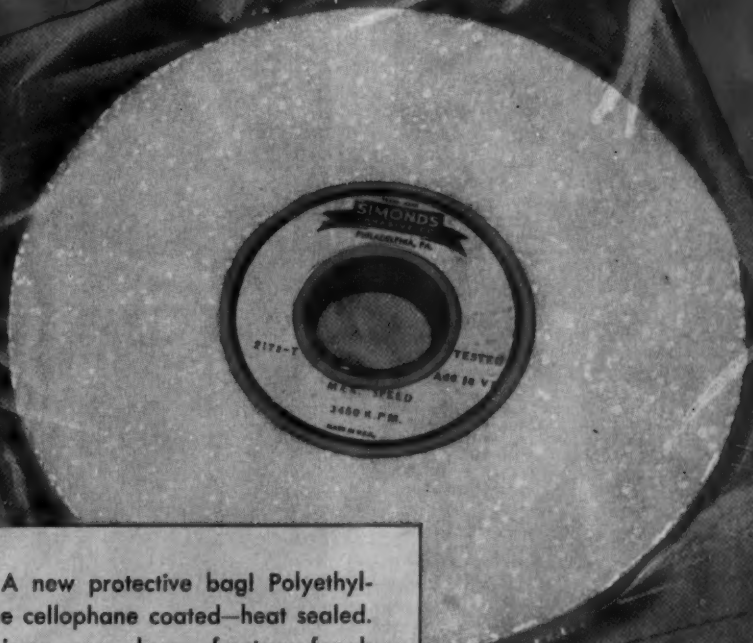
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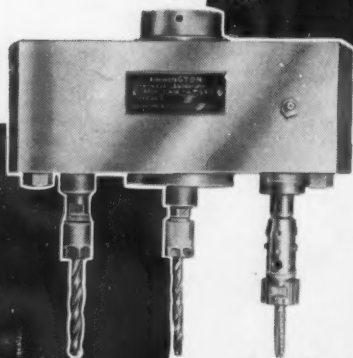
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Secretary of Commerce Sinclair Weeks is shown swearing in Ralph E. Cross, executive vice president of The Cross Company, Detroit, as assistant administrator of the Business and Defense Services Administration, U. S. Department of Commerce.

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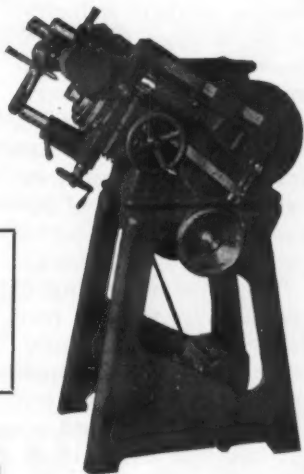
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Three-Way Marketing Service Offered by Jones & Lamson

By HOWARD A. FINCH*

*J & L offers sound leasing plan that
provides maximum flexibility for the lessee.*

THE Jones & Lamson Machine Company of Springfield, Vermont, is now offering a three-way marketing service that establishes top industry standards for sound practice in meeting the variable machine tool purchasing needs of industry. In developing the provisions of its new vertical-coverage marketing service for machine tool users, Jones & Lamson has drawn upon the most extensive background of production and marketing experience in the industry.

The general leasing of capital equipment is relatively new and, despite the publicity and recent impetus it has received, only a small proportion of all privately operated plant equipment is now under lease.

Actually, machine tool leasing has not reached the point where it has become standardized. There are almost as many forms of contracts as there are clauses; nevertheless, there will always be a sound basis for some method of leasing machine tools in our rapidly expanding industrial economy.

Because of these conditions, the tax and legal aspects of many types of rental contracts were studied by Jones & Lamson's marketing division to produce a sound leasing plan that provides the maximum advantage and flexibility for the user.

To facilitate further the expansion of American productivity and markets, Jones & Lamson now offers three plans for the procurement of machine tools. These plans



Howard A. Finch

* Manager of Marketing, Jones & Lamson Machine Company.

are designed to accommodate the widest possible variety of industrial needs and to establish top industry standards for sound practice.

First of these plans has been designated as the Outright Purchase plan. The outright purchase of capital equipment is generally preferred since it offers such obvious advantages to the user at lower cost, freedom from restriction, and full profit from the use of the equipment.

A second plan has been designated as the "Pay from Production" plan. A plan of this type is designed for those who prefer making payments from the additional savings created by the use of new and modern machine tools and on terms more favorable than can be obtained from most credit sources. Payments may be made on a one to

five year basis in equal monthly installments with a small down payment and a charge at the rate of 3.25 percent on the original unpaid balance.

The third plan of the new Jones & Lamson three-way marketing service is known as the Lease Plan. Under the Lease Plan the customer receives the normal one year guaranty and he may offer to buy the machine at the end of any year at the then existing fair market value or at a predetermined option price. In order to provide maximum flexibility, the Lease Plan is available in four variations, the principal differences being in the annual rental and return charges. With each plan, a ten percent deposit is required to be refunded to the customer upon fulfillment of transaction.

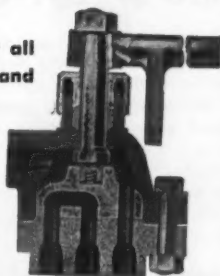
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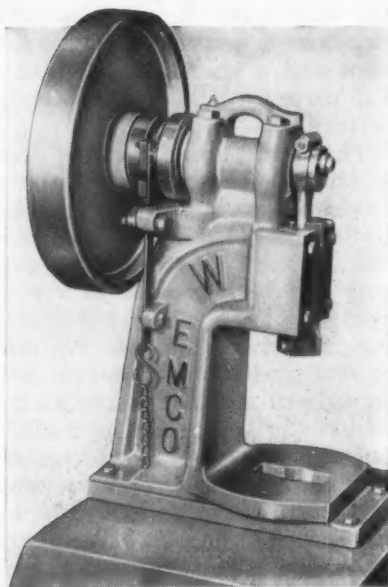
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This three-way marketing service now being offered by Jones & Lamson represents a major development toward further increasing the economic flexibility and production efficiency of American industry and should be of vital interest to all manufacturers.

Jones & Lamson officials are convinced that the best contract that a customer can obtain still involves knowledge and integrity of the supplier, and that these two factors are especially true in the matter of leasing to the prospective purchaser of machine tools who may find himself in a position of wanting to apply working capital to such things as plant modernization or expansion or any alternative use for his capital which may at the time seem more pressing or more profitable.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.



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hole location,
easy contour
inspection
with new
machine tool
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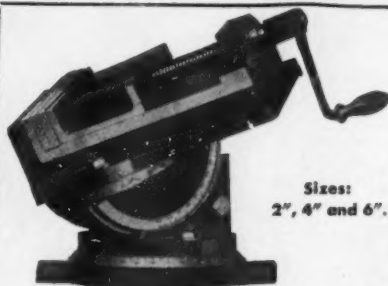


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new shop equipment

Electronic Machine Mills Original Master Airfoils

Designated as the Model 102, an electronic airfoil milling machine in which a non-contacting tracer control and a fair-curve interpolating system are combined for generating original three-dimensionally contoured shapes from a series of simple cross-sectional templates has been announced by Pratt & Whitney, Division Niles-Bement-Pond Co., 25 Charter Oak Blvd.,

West Hartford 1, Conn. According to the manufacturer, the machine is ideal for manufacturing original airfoil masters, master cams for production airfoil milling and grinding machines, metal patterns for various blade casting processes and general experimental and prototype machining of airfoil shapes. The unique system of correctly interpolating between corresponding points on various cross-sections (and extrapolating beyond them) while continuously producing proper "twist" in the airfoil, is said to permit developing blades with various experimental twist conditions without changing the basic setup.

Interpolation is accomplished through the use of commercial feeler stock which acts as a continuous flexing spline, constantly representing successive fairing elements of an



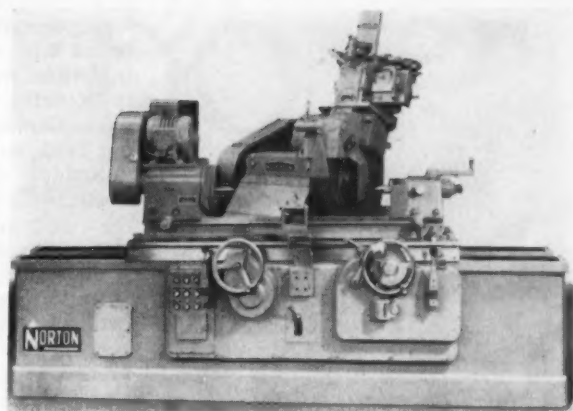
Model 102 Electronic Airfoil Milling Machine

Norton Type CV-4 Semiautomatic Angular Wheel Slide Grinding Machine

imaginary master blade having proper cross section shape but lacking twist. Twist-of-shape, it is claimed, is concurrently introduced by a programmed rotation of templates relative to workpiece rotation. The electronic non-contacting tracer operates through a measured 0.001-in. length spark gap and permits following the flexing feeler stock. The machine is said to be capable of speed ranges in the vicinity of 25 in. per minute.

Machine Grinds Thrust Surfaces and Adjacent Diameters Simultaneously

Norton Co., Worcester 6, Mass., has announced the Type CV-4 Semiautomatic Angular Wheel Slide Grinding Machine which is designed to rapidly grind thrust surfaces and adjacent diameters simultaneously in a single, automatically controlled plunge grind. According to the manufacturer, the machine eliminates the separate operation normally necessary when similar jobs are performed. Furthermore, the machine produces a concentric grain pattern in the finish of the shoulder or thrust surface ground. Fast, accurate sizing is said to be accomplished by means of the Norton CTU type wheel feed mechanism with its hydraulically rotated, micrometer-screw feed. The wheel feed mechanism includes a "click-count" index with which settings for work diameter reduction in increments as fine as 0.0001 in. can be made instantly and



without visual attention. Both the length and rate of automatic feed are quickly set from the normal operating position, and the handwheel which adjusts the grinding wheel feed is located on the machine base at the operator's right hand. An automatic wheel guard type truing device is a recommended extra item of equipment which quickly trues wheels to the required form and provides close, uniform control of the amount of abrasive removed from the wheel.

The Type CV-4 machine can accommodate heavy work loads and performs roughing or fine finishing operations with equal facility. The machine is available in 10 and 14-in. swings and in 36, 48 or 72-in. work lengths in either swing. In addition to hydraulic power table drive, an auxiliary hand drive mechanism is provided. When wheel guard truing is installed, the hand table drive only is provided, since the primary purpose of the hydraulic table drive is for truing.

Granite Cube Parallels Are Available in Matched Pairs

Cube parallels in matched pairs made of black granite (diabase) have



Rahn Granite Cube Parallels being checked

been announced by Rahn Granite Surface Plate Co., 636 N. Western Ave., Dayton 7, Ohio. According to the manufacturer, the cubes are precision finished on the top and bottom surfaces to a tolerance of 0.00005 in. for flatness, parallelism and the same height over the pair. Dimensions are nominal, with a tolerance of plus or minus 1/32 inch. The unusual hardness of the cubes provide for long life, and accidental nicks, it is claimed, will not raise any burrs to cause errors in measurements. The cubes are said to present no internal stresses to cause warping and no rust problems.

Machine Grinds Parts to Unusually Close Tolerances on High Production Basis

Designated as the No. 12½, a plain heavy-duty centerless grinder which is said to grind parts to unusually close tolerances on a high production basis has been developed by Landis Tool Co., Waynesboro, Pa. The machine incorporates features that make the application of automation both practical and economical. Automatic loaders and automatic cycles can be used for production of parts by either the infeed or throughfeed method. A variation of the infeed method, known as end-feed grinding, is used when grinding tapered work. The machine is capable of grinding

workpieces with a maximum diameter of 6 in., and the maximum grinding wheel width is 10 inches. A variety of extra equipment and tooling is available, including hydraulic grinding feed, automatic cycles, hand and automatic work loaders, automatic dressing with automatic diamond feed, heavy-duty work rests and sizing gages.

The machine features pressure lubrication for the grinding wheel spindle bearings. This method floods the bearings with filtered lubricating oil from a separate reservoir and has its own pump and safety pressure switch. Microsphere bearings are used for both the grinding wheel spindle and the regulating wheel spindle. Two methods of dressing the regulating wheel are available. One method dresses the wheel on the line of work contact by hydraulically moving the wheel head past a diamond mounted on the work rest. A hand operated dresser for compensation and wheel tilt is also provided. A hydraulically operated profile dresser is available for the regulating wheel head.

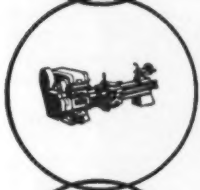
Landis No. 12½ Plain Centerless Grinding Machine



SHELDON

CHICAGO

U. S. A.



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OFTEN PAYS OUT ON THE FIRST JOB...

and gives additional years of "cost free" service.

In the past, lathes were generally bought as large and as heavy as possible to insure accuracy and sufficient power. Now, with accurate, low-cost Sheldon Precision lathes, it is more profitable to buy these faster, cost-cutting lathes for the specific job at hand just as you would buy jigs and fixtures.

In savings of tooling costs, operator cost, power cost, and plant loading, as well as extra profits from more pieces per hour, Sheldon lathes often pay back their cost on a single run.

Sheldon lathes will work to the closest tolerances—have "Zero Precision" Taper Roller Bearings. They can take a healthy cut when operating at high speed direct drive—have double V-belts to the spindle. They will swing 10", 11", or 13" and have a 1 3/8" hole through the spindle—have sufficient capacity for the great bulk of lathe work. Sheldon lathes have created a new factor for figuring machinery costs. They are tools you should know about.

SHELDON MACHINE CO., Inc.

4250 N. Knox Ave.

Chicago 41, Illinois

**TWENTIETH CENTURY
MANUFACTURING CO.**



**Uneda
LIGHT**

**DIRECTS A BEAM OF WHITE LIGHT
ON YOUR CLOSE PRECISION WORK**

▼ Tool and Die Makers acclaim it for utility, getting into nooks or crevices hard to reach with ordinary light—for lining up punches in dies or working with the scribe in close places. Completely adjustable and portable. Light does not reflect back to your face. Ideal for inspectors seeking burrs, flaws, etc.



**Price complete with
2 size bulbs \$13.75**

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No. 30**

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STOP
PINS
& FINGER STOPS**

▼ STOP-PINS are complete self contained units that hold securely in stripper plate. All sizes have 1/32" wall permitting insertion close to die or punch. No threads inside STOPS for springs to catch on.



STOP-PINS (5 Sizes)

▼ GARBERDING FINGER STOPS made in uniform width to fit any standard width slots. Just grind ends to fit. Write for Literature



FINGER STOPS (3 Sizes)

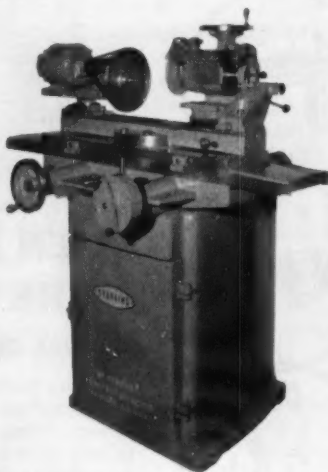


**TWENTIETH CENTURY
MANUFACTURING CO.**

**ROUTE 176 and BRADLEY ROAD
BOX 429M, LIBERTYVILLE, ILL.**

**Tool and Cutter Grinder Features
Anti-Friction Table**

McDonough Mfg. Co., 1521 Gallo-way St., Eau Claire, Wis., has announced the Sterling Model "G-2" Universal Tool and Cutter Grinder which is said to have several improvements over the Sterling Model "G." The improved model utilizes an anti-friction table in place of flat and vee ways. This, plus the location of controls for easy operation from either



**Sterling Model "G-2" Universal Tool and
Cutter Grinder**

side or front, is said to speed up operation while reducing operator fatigue to a minimum. Two speed table travel is provided. Other improvements have been made in the raising and lowering mechanism and the in-feed mechanism to provide unusual accuracy and finer control.

The Model G-2 machine has a 10 3/4-in. swing over the table, 27 in. between centers and an 18-in. table travel. The wheel head is equipped with a 1-h.p. 3,450-r.p.m. Ex-Cell-O motorized spindle with permanently

Now! S-T-R-E-T-C-H your Tapping Capacity!

With PROCUNIER Tapping Heads

Month after month of steady, rigorous high speed production tapping is taken in stride with versatile Procunier Tappers. Built to rigid standards of accuracy and dependability, they provide longer hours of efficient tapping, with fewer costly shutdowns, less parts spoilage and a big reduction in tap breakage. These combined advantages enable operators to increase their capacity to handle bigger production jobs with greater ease, accuracy and speed. Only Procunier tapping attachments offer faster, smoother action, longer life, less wear and vibration with a minimum of maintenance.

Check these Procunier Advantages:

1. Tap breakage is practically eliminated due to the high sensitivity of the new cork-faced friction clutch which automatically regulates the driving pressure.
2. Strain and wear are minimized and torsion eliminated thru special gear reversing mechanism which distributes pull evenly.
3. Tap wobble is eliminated because chuck spindle is supported at both ends.
4. Aluminum housing assures greater strength with minimum weight—a vital factor for high speed tapping. PLUS MANY OTHER EXCLUSIVE FEATURES.

Write Today for more complete details and specifications on the complete line of Procunier Tapping Heads and see why Procunier offers the "finest in tapping equipment."



New
"Tru-Grip"
Tap
Holder

The exclusive Procunier "Tru-Grip" tap holder is lighter, smaller in diameter. It affords easier tapping close to walls or shoulders, eliminates "chewed" tap shanks. Holds tap true.

Procunier

Safety Chuck Company

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PROCUNIER SAFETY CHUCK CO.
12 S. CLINTON ST., CHICAGO 6, ILL.

Dept. 8

Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

Name.....

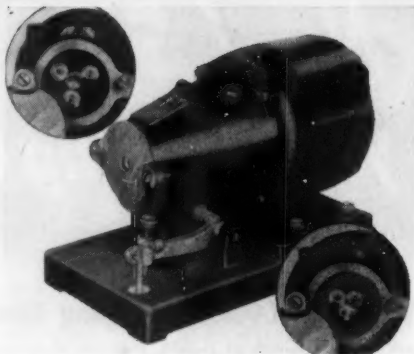
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City..... Zone..... State.....

sealed lubrication. The wheel head swivels a full 180 degrees in either direction. The grinder is available in either plain or universal models.

Self-Centering Wire Stripper Provides Extra Cutting Edges

A triple-disc cutting mechanism that automatically centers the wire it strips of insulation and provides its own extra cutting edges is the fea-



High Speed Wire Stripper



DORMAN

AUTOMATIC REVERSE TAPPERS

- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.

No. 1A FRICTION DRIVE TAPPER — capacity No. 2-56 to $\frac{3}{8}$ " in Steel — $\frac{1}{2}$ " in Aluminum.

No. 2B POSITIVE TAPPER — capacity $\frac{3}{8}$ " to $\frac{7}{8}$ " in Steel.

No. 3A POSITIVE TAPPER — capacity $\frac{1}{2}$ " to $1\frac{1}{4}$ " in Steel — $\frac{1}{2}$ " to $\frac{3}{4}$ " Pipe Taps.

No. 4A TAPPER — capacity $\frac{3}{4}$ " to 2" in Steel including Pipe Taps.

- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

Priced from **\$50.00**
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IMMEDIATE DELIVERY

THRIFTMASTER PRODUCTS CORPORATION
Division of Thomson Industries, Inc.
1034 N. PLUM STREET, LANCASTER, PA.
STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

ture of a wire stripper manufactured by High Speed Hammer Co., Inc., Rochester, N. Y. Insulation is removed by three hardened steel discs which are angled into cutting position slightly overlapping each other and which are preadjusted to cut through the insulation. The slight pressure on the core of the wire at the intersection of the three arcs centers the work for accuracy. Loosening and turning each of the three discs slightly presents a new set of cutting edges.

The stripper, a $\frac{1}{4}$ -h.p. bench unit designed for high speed production line stripping, removes all types of insulation, including plastic types, from solid, stranded or multi-conductor wire. Provision has been made for simple adjustments for diameters up to $\frac{1}{2}$ in. and strips to $1\frac{1}{2}$ in. long.

FOR MOST LATHES TO 1" BAR STOCK CAPACITY . . .

STEP UP PRODUCTION 20% +

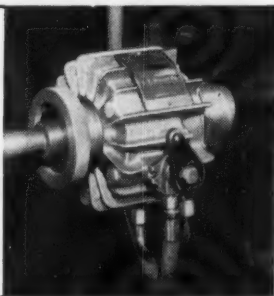
- Hold delicate parts without damage or adjustment
- Iron grip for heavy work
- No adjusting for stock or part variations
- Finger-tip or foot control eliminates operator fatigue
- Eliminates jarring of head stock

(Ten-day FREE TRIAL to reliable firms)

WILSON AIR COLLET CLOSER, INC.

909 40th Avenue NE

Minneapolis, Minnesota



Cuts Metal
15 Times Faster
 than
Hand Hack Saw!



**NEW . . . Porter-Cable
 Portable Band Saw**

\$215.00
 only

Slices through 1½" cold rolled steel in 41 seconds! That's fifteen times faster than a good man with a hack saw . . . *two-and-a-half times faster* than bulky power hack saws!

You can use this 16-pound work-demon anywhere—on ferrous or non-ferrous metals or "problem" materials. Take it into equipment yards, stock bins . . . tight spots where costly hand sawing is the only other answer. Use it for general maintenance, teardowns. Compact, easy to handle, Porta-Band delivers smooth controlled sawing in any position. Only the cutting part of

the blade is exposed. Cutting action pulls the blade snugly into cut, holding saw firmly in place.

Powered for heavy duty . . . perfectly balanced . . . Porta-Band handles the toughest assignments. Band speed of 240 feet per minute insures swift, smooth cutting of all materials up to 3¼" diameter round, or 3¼" x 4¼" rectangular. Highest grade precision ball and needle bearing throughout. Aluminum alloy frame for lightness, toughness. Universal 115V AC-DC, 25-60 cycle motor (230V available at extra cost).

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 2308 N. Salina St., Syracuse 8, N. Y.

(In Canada, send to: Strongridge, Ltd., London, Ont.)

Send full information on Porta-Band and name of nearest dealer.

Name

Company

Type of Business

Street

City County State

Manufacturers of Speedmatic and Guild Electric Tools

Porter-Cable

Quality Electric Tools

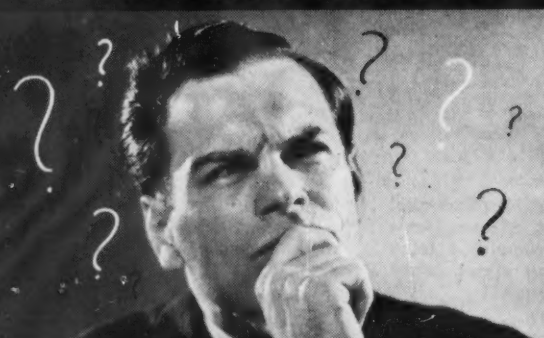
Unit Is Designed Primarily for Low Temperature Testing

Identified as the Model A-120-1, a test unit which is designed primarily for low temperature testing, but which can be easily adapted to high and low temperature operation has been announced by Cincinnati Sub-Zero Products, 3930-S3 Reading Rd., Cincinnati 29, Ohio. The basic cold unit has a capacity of 1 cu. ft., and the addition of an explosion-proof 500-watt heater,

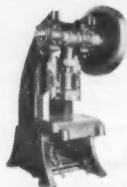
available as a test accessory, extends the temperature range of the basic unit from minus 120 to plus 200-deg. F. to permit testing operations at high temperatures. Available test accessories include an air circulator in the lid for rapid cooling or heating; observation window in lid; 6 x 6-in. window in front; interior lights; entrance holes; electrical terminal pad with up to 24 terminals inside and outside the cabinet; and instrumentation as required by the user of the unit.

The refrigeration system is hermetically sealed and requires no special installation procedure. The chilling chamber is electric welded

GOT PRESSROOM PROBLEMS?



Solve 'em with
FEDERAL *Open back Inclined* **PRESSES**



STANDARD

Non-repeat clutch—18 to 80 ton sizes—in geared or flywheel type.



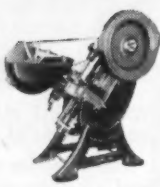
DIAL FEED

Fast, accurate, safe—18 to 80 ton sizes—geared or flywheel type.



HIGH SPEED

Air clutch—electro-pneumatic controls—in 18 to 80 ton sizes.

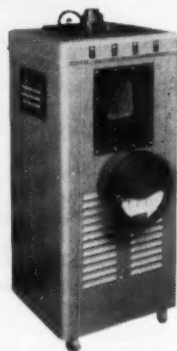


SPECIAL

Capscrew, bolt trimming and extruding presses—26 to 65 ton sizes.

Write for New
Catalog No. 13

THE FEDERAL PRESS COMPANY
504 Division St., Elkhart, Indiana



Sub-Zero Model A-120-1 Test Unit

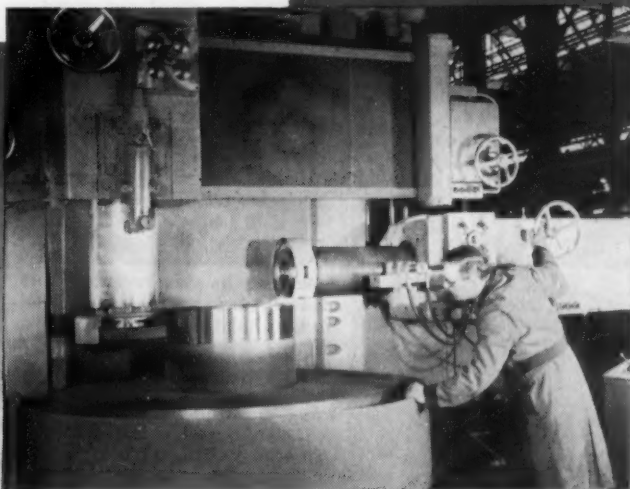
steel, made pressure tight and hot-dipped zinc coated. Measuring 43 in. high x 20 in. long x 18 in. wide, the unit weighs approximately 500 lb. The testing chamber is 12 x 12 x 12 in. deep.

where
*Endurance
 and Accuracy*
 count . . .

Choose a

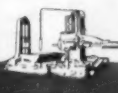
BULLARD

Have
 your
BULLARD
 Representative
 explain
 the
 many
 features
 of



. . . The Vertical Chucking Grinder

The combined use of mechanical, hydraulic and electrical components provides the accuracy, flexibility, power and ease of operation so essential in precision grinding on larger sizes of work. The Bullard Vertical Chucking Grinder is available in six sizes from 30" to 74", made to meet every present day requirement.



THE BULLARD COMPANY • BRIDGEPORT 2, CONN. Tel. (Area 6) 2511

Toolholder Combination Eliminates Carbide Grinding

A combination of carbide tooling, incorporating a toolholder and "throw-away" carbide blanks, which is said to eliminate all carbide grinding, has been announced by Vascoloy-Ramet Corp., Waukegan, Ill. The toolholder is designed with a built-in carbide chipbreaker which, it is claimed, provides the correct chip formation over a wide



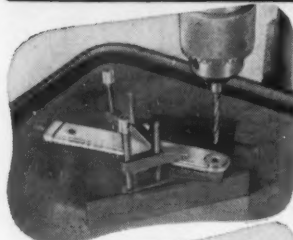
V-R Toolholder Combination

cutting range for single chipbreaker width, eliminating chipbreaker grinding.

The throw-away carbide blanks are available to fit all styles of triangular, square and round toolholders, and are designed to be used on all cutting edges without grinding and then thrown away.

The toolholder is available as neutral or negative rake. The rake can also be easily changed without removing the toolholder from the tool post by a simple interchange of parts. According to the manufacturer, the toolholder keeps the cutting edge automatically positioned, and a new cutting edge is quickly obtained by indexing the insert or changing inserts without removing the holder from the tool post.

Drill Holes within .001" Accuracy with the Master Optical CENTER LOCATOR



Speediest—Simplest—most accurate method of locating centers and drilling holes. For a decade, machinists have been drilling and spacing holes with the Center-Locator to within .001". Just the thing for drilling round holes in thin material . . . avoiding drill run-outs . . . counter-boring holes with an ordinary drill. Makes your drill press do the work of a jig boring machine!



Easy to operate: Simply lay out your work with a height gauge, locate center through the powerful magnifier, then replace the magnifier with any of 16 drill bushings furnished.



38⁵⁰

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or from your dealer.

Unconditionally guaranteed.

Bulletin on request

**Affiliated with
Specialty Products Co.**

MASTER SPECIALTY CO., INC.

3725 Monitor Avenue
Minneapolis 16, Minnesota

Mobile Auxiliary Bench Is Versatile and Efficient

Identified as the Shop Tender, a mobile, multi-purpose auxiliary bench designed for unusual versatility and maximum efficiency has been announced by Sturdi-Bilt Steel Products, Inc., 2501 W. Peterson Ave., Chicago 45, Ill. The unit is said to be ideal for carrying tools and parts to any job anywhere in the shop and provides an oil and grease resistant, bonded, plastic-impregnated wood work-bench surface wherever it is needed. Adjustable back and side rails on the three sides of the work top can be snapped either into a raised position, so small parts are kept from rolling off, or can quickly be depressed, flush with the top so longer or larger pieces can be handled.

Other features of the bench include versatile height adjustments covering

a range of more than one foot; optional 24 x 24-in. bonded wood top with drop sides; optional 15 x 18 x 5-in. drawer; and optional wheel set or



Sturdi-Bilt Shop Tenders

casters. Where the unit is used in a fixed position, the vertical adjustments in each leg can be used to correct unlevel floors.



STOP RUST with ONE HAND

Yes, it's as easy as that! Just press the button on the top of the Rust Veto Spray can and metal parts are protected against rust with a clear, durable coating that seals out moisture.

Ideal for protection of parts in storage or between operations; also for tools, dies, jigs and fixtures in tool room. Leaves dry, waxy film that does not have to be removed before further use or processing.

Order a supply today and veto rust with Rust Veto Spray. Attach coupon to your purchase order.

Sold by case only

E. F. HOUGHTON & CO.

303 W. Lehigh Ave., Phila. 33, Pa.

Please send _____ cases of Rust Veto Spray (1 doz. 12-oz. cans per case) at \$15.24 per case f.o.b., Lancaster, Pa.

Name _____

Company _____

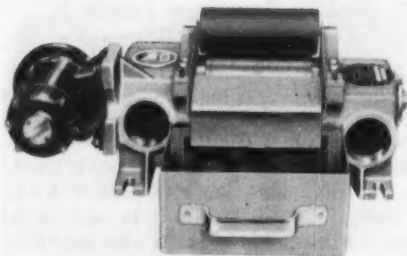
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City _____ Zone _____ State _____

MR-54

Small, Compact Separator Cleans Liquid Coolants Automatically

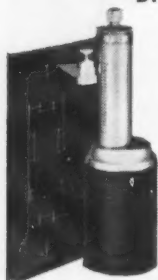
The Houdaille Magnetic Separator which is designed to automatically filter out ferrous metallic particles from coolants and cutting oils has been introduced by Honan Crane Corp., Lebanon, Ind. The separator is a small, compact unit which operates continuously to provide a constant supply of clean coolant for all types of machine tools and which can be in-



Houdaille Magnetic Separator

MICRO-HEIGHT GAUGE

BY FAIRFIELD GAUGE CO.



**NO OTHER GAUGE
COMPARES FOR
FAST, ACCURATE
LAYOUT AND
MEASURING**

Capacities to
6" when used
with this
Fairfield Gauge
3" Riser

The Micro-Height Gauge is a precision instrument, finished in satin chrome, which reads like a micrometer and measures from zero at base to 3" in thousandths. Use as a scribe for fast layout, or insert dial indicator for quick, accurate inspection.

Exclusive distributor for U.S. and Canada:

CLEVELAND INSTRUMENT CO.

735 Carnegie Ave., Cleveland, O.

stalled on the machine tool sump. Contaminants are removed by means of permanent ring magnets completely enclosed in a revolving cylinder. According to the manufacturer, unique construction assures 360 degrees of constant magnetic attraction. The cylinder is driven by a 1/70-h.p., 4.8-r.p.m., gear head motor.

A turbulent flow of coolant in a specially designed channel below the cylinder is said to keep metallic particles in suspension until attracted by the magnetic field. An adjustable, non-magnetic wiper trough collects particles carried out of the solution by magnetic discs. The separator is available in 10 and 20 g.p.m. capacities for soluble oils and in 5 and 10 g.p.m. capacities for mineral oils. Flexible design, it is claimed, makes installation easy on all types of machine tools. The unit features five 2-in. ports, drilled and tapped, three of which may be used as inlet and two as outlet.



IN 11 SIZES—No. 6 to 1"
N.C. In all S.A.E. sizes.



*You Need an Extra Hand Now
to Speed Up Production!*

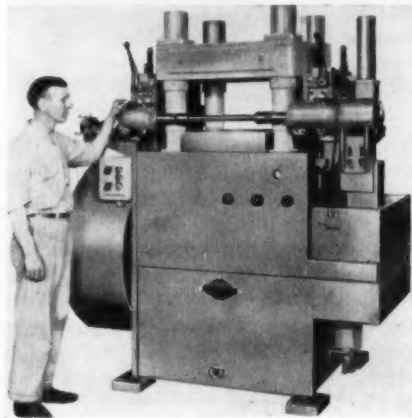
HEIMANN TRANSFER SCREW SETS

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

HEIMANN MFG., CO. • URBANA, OHIO

75-Ton High-Speed Production Press Has 4-Inch Stroke

Alpha Press and Machine, Inc., 9281 Freeland Ave., Detroit 28, Mich., has announced a 75-ton high-speed production press which has a 4-in. maximum length of stroke, a 1-in. stroke at 300 strokes per minute and a 2-in. stroke at 200 strokes per minute. By means of an air clutch and brake combination, strokes can be inched, single or continuous. Clearance between



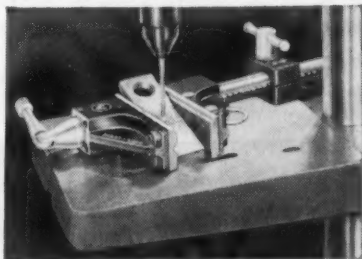
Alpha 75-Ton High-Speed Production Press

columns is 19 in. right to left and 15 in. front to back. Other sizes, right to left between columns, are available in multiples of 6 in., with the front to back dimensions remaining constant.

Automatic force feed lubrication to all moving parts, including roll feed, pull-out rolls and scrap cutter, is provided, and all controls are electrical. Point loading of 75 tons, it is claimed, can be handled anywhere along the center line of the machine, right to left, column to column, and the press can handle unbalanced dies without distortion. Shut height adjustment at the top of the press permits the releveling of the upper arm in respect to the bolster plate.

VERSATILE VISE

can repay its cost the very first day!

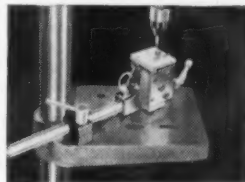


PREVENTS ACCIDENTS—This full-floating, securely anchored drill press safety vise holds work, including sheet metal, for drilling in many positions . . . keeps it from flying off the table.

CUTS JIG COSTS—Serves as base and instant-opening mechanism for low-cost jig . . . cuts jig parts and costs by as much as 80%.

SPEEDS SET-UPS—Ratchet-locking jaw slides instantly from maximum (9" or 12") opening to any position. A 1/4-turn of the handle and screw-actuated jaw positively grips or releases work, including round stock.

Ask your distributor for a demonstration or write us for folder W-50.



Above:
Angle Drilling

Below:
Low-Cost Jig

WAHLSTROM/FLOAT-LOCK SALES DEPT.

AMERICAN MACHINE & FOUNDRY COMPANY

Room 22, 261 Madison Ave., New York 16, N. Y.

Another **Amf** Product

Float-LOCK
SAFETY VISES

Materials Handling Box Tiers and Nests

The Chas. Wm. Doepke Mfg. Co., Inc., 8879 Blue Ash Rd., Rossmoyne, Ohio, has announced a large materials handling box, designated as the NesTier Model No. 360, which measures 36 in. in length x 10 in. high x 16½ in. wide. The all-welded 14-gauge steel boxes tier in rigid stacks when filled, each unit resting securely on



NesTier Model No. 360 Materials Handling Boxes in use



Looking for a **WIDER SELECTION?**

ACE has just what you are looking for — the finest Drill Bushings ever made! Now over 22,000 A.S.A. and other standard sizes plus specials. Also hexagon, knurled or serrated bushings for use in soft or castable materials.

Always Specify Ace!

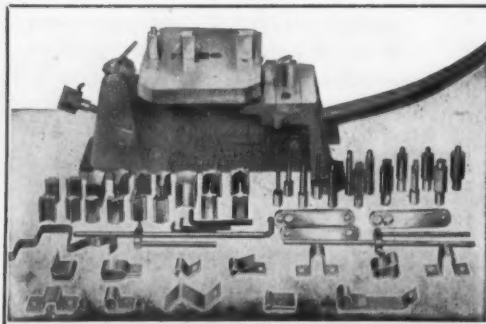


ACE DRILL BUSHING CO., INC.

5407 FOUNTAIN AVENUE
LOS ANGELES 29, CALIF.

the upraised handles or bails of the box below. Contents remain fully visible and accessible. Empty boxes nest, conserving valuable floor space. According to the manufacturer, the boxes can be used in conjunction with powered belt, overhead, wheel and roller conveyors. Large unit loads may be tiered on skids or pallets for transporting anywhere in the plant by power lift trucks.

The units are said to be ideally suited for pressroom and other materials handling applications where there is no need to manually lift a filled box. Tiered units may be utilized as small parts storage bins.



Multiform BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

**AIR OR HAND MODELS FOR UP TO
¼" to 4" MATERIAL**

Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.

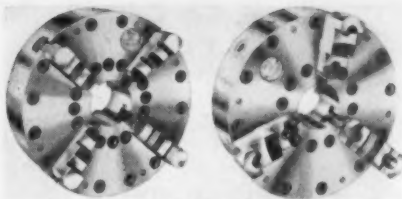
Dept. 6-M

Kalamazoo, Mich.

Segmental Plate Type Chuck Features Accurate Jaw Slots

The Whiton Machine Co., New London, Conn., has announced a segmental plate type chuck in which the jaw slots are formed in separate, segmented plates which are subsequently mounted on the chuck body. According to the manufacturer, the plates are hardened and finish ground before being assembled on the chuck body, thus the jaw slots are unusually accurate. The precise fitting of jaw to slot, it is claimed, can be maintained almost indefinitely to provide maximum strength, rigidity and accuracy in the chuck. The segmental plates may be mounted on a heat treated steel body, a body of ductile iron or a body made of aluminum alloy, the latter intended for use in high speed turning operations.

The segmental plate type chuck is available in both independent and geared scroll models. An outstanding



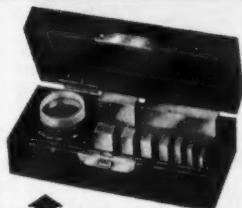
Whiton Segmental Plate Type Chucks

feature of the independent model is its full circle thrust bearing which is locked into position within the chuck body by the segmental plates. Construction features of the scroll type chuck include hardening and grinding of both scroll bearing surface and the spindle mounting section which is applied to the American Standard spindle nose. Because both the scroll bearing and the spindle recess are located in the solid body, it is said to be possible to make the scroll itself more nearly concentric with the machine parts.

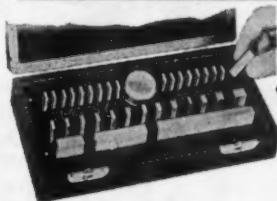
ULTRA-CHEX GAGE BLOCKS *for Every Need!*

Supplied in one Superior Accuracy

5 MILLIONTHS ± ACCURACY

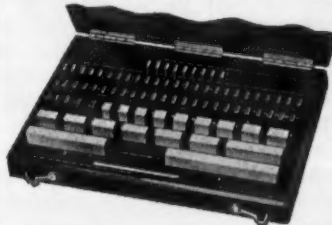


9 Block Set \$22.50
OPTICAL PARALLEL \$5.00



34 Block Set \$125.00
INCLUDING OPTICAL PARALLEL

All Sets at "Money Saving Prices" due to Mass Production Methods.



82 Block Set

\$275.00 Complete

This Set will supply the needs of any discriminating shop that must work to gage-block precision.

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Here's a real
profitable line!*

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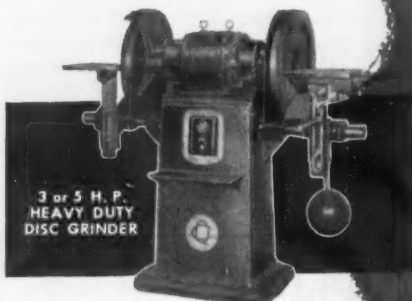
GEORGE SCHERR CO., Inc.

200-MM LAFAYETTE ST. • N.Y. 12, N.Y.



**"Time Savers
in any shop"**

**QUEEN CITY
heavy duty
DISC GRINDERS
and BUFFERS**



Queen City Heavy Duty Disc Grinders and Buffers are designed for the hardest use. Extra heavy spindle, large, high quality ball bearings and special duty motors all contribute to long, trouble-free service.

The complete range of Queen City Grinders and Buffers . . . floor and bench types . . . in sizes from $\frac{1}{3}$ to 10 H. P. . . is described in a free 24-page catalog.

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**QUEEN CITY
MACHINE TOOL CO.**

QUEEN CITY
MACHINE TOOL CO.
3911 Kellogg Avenue,
Cincinnati 26, Ohio

"Queen City Grinders—Famous For Over 50 Years"

**Variable Speed Unit Is
Small and Compact**

Reeves Pulley Co., Inc., Columbus, Ind., has announced the redesigning of its fractional h.p. Vari-Speed Motordrive, resulting in a small, compact unit which is available in 112 different assemblies to meet exact space requirements. The redesigned unit can be supplied in $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and 1-h.p. sizes in speed ranges from 2:1 to 10:1. The speed control unit is not only available in horizontal and vertical



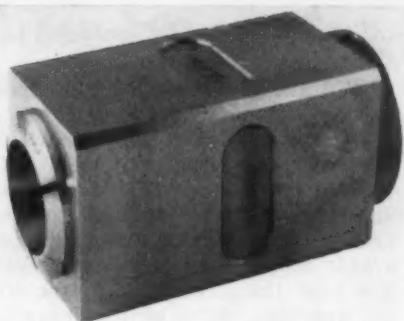
Reeves Redesign Fractional H.P. Vari-Speed Motordrive

models, but also 45-degree types and with vertical down output shafts. Speeds from 3 to 4,660 r.p.m. can be furnished. Another feature of the unit is a "threaded" spiral groove lubrication system which is said to assure complete coverage of lubricant over all sliding surfaces. In case of excessive lubrication, an overflow outlet is provided to carry excess lubricant away from the disc faces and V-belt. The unit is also available with an extended handwheel control, electric remote control and mechanical automatic control, as well as the standard handwheel.

Block Chuck Permits Accurate 90-Degree Indexing of Round Stock

M and H Products, Inc., Box 1057, Danbury, Conn., has announced the Brown Block Chuck which is said to simplify accurate indexing of round stock for cutting squares, splines, keyways, flutes, and so on. A hardened and ground steel block with an accurately centered collet seat and drawnut, the unit is said to be square and parallel to within 0.0005 inch. With a workpiece clamped in the collet, the block is simply held in position by a four-jaw chuck, magnetic chuck or vise and flopped 90 or 180 degrees after each cut is finished, eliminating the need to release the workpiece from the collet until the job is completed. The chuck can be used on lathes, milling machines, surface grinders or drill presses.

Placing the block chuck on a magnetic sine bar or in a universal vise,



Brown Block Chuck

it is claimed, enables the user to index compound angles, such as are required for tapered square shanks and tapered fluting. Using the chuck in a common or magnetic V-block doubles its indexing stations, permitting octagonal indexing and other work involving increments of rotation of 45 degrees.

SAVE COSTLY SET-UP TIME!

Instant Pin-Point Positioning
with these NEW MAGNETIC BASE
DIAL INDICATOR HOLDERS

"TINY-TITAN

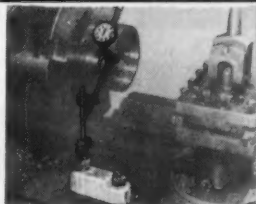
NO. 130"

Magnetic Base
Indicator Holder
with Precision
Adjustment



- ✓ New, 3-Step Universal Rod in 7/32, 1/4 and 5/16" diameters, for all indicators.
- ✓ Mounts to flat or down to 3/4" round surface with 65 lb. pull.
- ✓ Adapter permits full 360° adjustment in all directions.
- ✓ Many other new features.

PRICE: \$9.50,
Attractively Boxed.

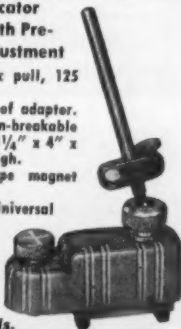


Model 160 being used to indicate workpiece on Engine Lathe

"TINY-TITAN

NO. 160"

Heavy Duty, Duplex Magnetic
Base Indicator
Holder with Pre-
cision Adjustment



- ✓ Magnetic pull, 125 lbs.
- ✓ Foot proof adaptor.
- ✓ Case non-breakable tonite, 1 1/4" x 4" x 1 1/8" high.
- ✓ Jack type magnet release.
- ✓ 3-Step Universal Rod.

PRICE:
\$17.75,
Attractively
Boxed.

Send for Bulletin No. 605, covering other Tiny-Titan tools.

ENCO MANUFACTURING COMPANY, Dept. 184
4520-26 W. Fullerton Ave., CHICAGO 39, ILL.

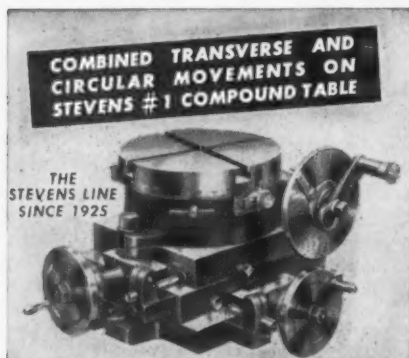
Sold all over the U.S. and Canada
through Enco franchise dealers.

A.C. Type Welder Is Designed for Production Welding

The Lincoln Electric Co., Cleveland 17, Ohio, has announced an a.c. type welder, designated as the "Fleetwelder Special," which is available in 300, 400 and 500 ampere, N.E.M.A. rated, sizes and which is designed for production welding operations. Used for a wide range of a.c. welding production jobs, the welder has a free circuit reactor control of welding cur-



Lincoln "Fleetwelder Special" A.C. Type Welder



Combines $3\frac{3}{4}$ " longitudinal and $3\frac{3}{4}$ " transverse movements with circular movement of $7\frac{1}{2}$ " Rotary Table. • Rotary Table and Compound Table can be used separately. • Larger No. 2 Compound Table also available.

WRITE FOR BULLETIN

Rotary Tables • Multiple Spindle Index Centers • Vises • Screw Head Slotters

The John B. Stevens Company

Main Street, Somersville, Conn., U. S. A.

rent, separate from the main transformer which can be adjusted continuously through a wide range of currents. The control is also sensitive to a wide range of welding conditions and highly responsive to changing arc conditions. The machine is said to be equally adaptable to sheet steel or heavy plate.

The machine is built for heavy duty—frame, core and case are welded steel and copper windings have spun glass, refined asbestos and mica insulation and mica coil separators. The current control mechanism operates through a double reduction gear drive with a ball bearing shaft to permit rapid current selection with ease and



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Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

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THE DYKEM COMPANY
 2301F North 11th St. • St. Louis 6, Mo.



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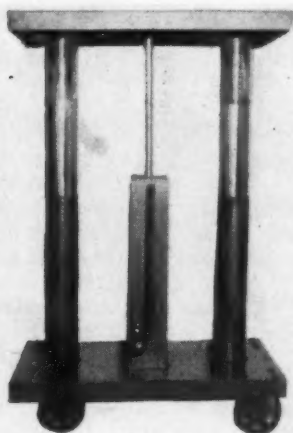


Without DYKEM Steel Blue

trouble-free operation. The unit can be supplied with or without power factor correction. A three-wheeled undercarriage for portability is available as optional equipment.

Hydraulic Lift Table Has 2,000-Pound Capacity

W. J. McElmoyl Co., Groveville, N. J., has announced a hydraulic lift table which has a 2,000-lb. capacity with a 3,000-lb. hydraulic unit capa-



McElmoyl Hydraulic Lift Table

city. The table measures 29 in. long x 19 in. wide and has a rise from a low of 30 in. to a high of 48 inches. According to the manufacturer, the unit makes an ideal positioning table for welding or for transporting heavy dies and castings to presses or milling machines, or it can be used as an adjustable work bench. Of all-steel construction for rugged service, the table is mounted on two 5-in. rigid heavy-duty casters and two 5-in. swivel heavy-duty casters, making it easy to maneuver through narrow aisles and crowded spaces.

Order Zagar Collets and Collet Fixtures at These Low Prices

Zagar has a fixture for every collet tool application. Order NOW from your local tool supplier.

STOCK DELIVERY!

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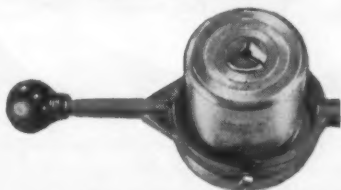
2"—

\$285

ZAGAR HOLDING FIXTURE

1"—\$95

2"—\$145



COLLET LATHE CHUCK

1"—\$125

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AIR-OPERATED FIXTURE

1"—\$165

2"—\$195

5-C
Collet



\$4.90 W&S No. 2—\$6.75

ZAGAR TOOL, INC.

24000 LAKELAND BLVD., CLEVELAND 23, O.

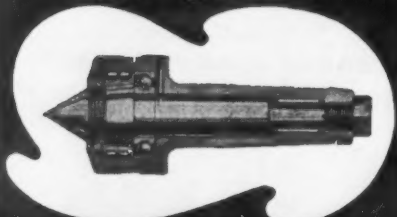
Gage Checks Hard-to-Reach Dimensions of Crankshafts

Designated as the Model 1340 P-40, an indicating snap gage built especially for measuring crankshafts or similar work where projections of the workpiece require a longer reach than usual has been announced by Federal Products Corp., 4146 Eddy St., Providence 1, R. I. According to the manufacturer, the gage is made thin so that it can get in between the



Federal Model 1340 P-40 Crankshaft Indicating Snap Gage

NIELSEN Heavy Duty Live Centers



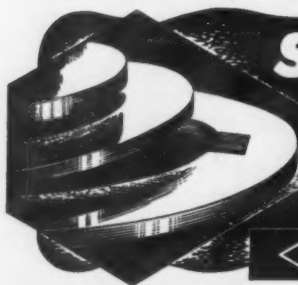
Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog
M on live centers

NIELSEN, INC. LAWTON, MICHIGAN

shoulders and right up to the sides of bearings, and the gaging anvils are flat so that they can get close enough to these critical dimensions to obtain accurate measurements. The indicator dial is located above the handle, clearly visible at all times and not obscured by the operator's hand. The measurement is transferred from the sensitive anvil to the indicator through an efficient, integrated pantograph unit which has sufficient resistance to counteract the weight of the gage and the operator's hand. The pantograph unit is also said to be free of friction, inertia and side play.

The crankshaft gage can be supplied in any single dimension between



Specify



Arbor Spacers and Shims

For milling, slitting and gang-saw setups, shimming gears and bearings. Sets in 20 diameters $\frac{3}{8}$ " to 4" . . . 19 graduated thicknesses .001" to .125", specials over .125". Spacers with keyways, shims without. Stocked by Industrial Distributors.



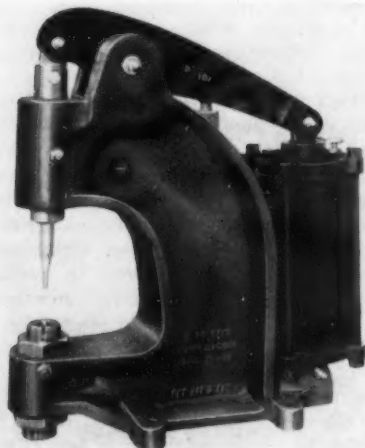
DETROIT STAMPING COMPANY

349 MIDLAND AVENUE • DETROIT 3, MICHIGAN

1.875 and 3 inches. Though thin, the frame thickness being 0.250 in., the gage is of a sturdy steel construction and is rigid, with tungsten carbide measuring tips to assure long service.

Riveter Clinches up to ¼-Inch Steel Rivets

Robinson Products, Inc., 16550 Wyoming Ave., Detroit 21, Mich., has announced an air powered, bench model



Robinson Air Powered, Bench Model Riveter

riveter which is said to be capable of clinching up to ¼-in. tubular steel rivets. Designed for sustained use, the riveter utilizes a rugged air cylinder which delivers over 2 tons of pressure, taking a maximum of 150 p.s.i. from normal air supply lines. Having a full 1-in. stroke, the machine may also be used for stapling, light punching, knocking out rivets, and so on. Semiportable, the unit weighs 60 lb. and may be bolted or clamped anywhere in the shop. The riveter is foot operated with a metering-type treadle valve, giving positive control of the action.

New Method Makes Higher Quality Marking Devices

Use of highest quality tool steel and carefully controlled heat treatment in the production of all types of marking devices including steel stamps, inspector's code symbol stamps, embossing dies, marking hammers and roll dies increases life of the devices and reduces overall cost to the user.

The complete line of these steel marking devices is described in Catalog NM-51, available on company letterhead from New Method Steel Stamps, Inc., 147 Jos. Campau, Detroit 7, Michigan. Also described and illustrated are type holders and interchangeable type, automatic roll markers for screw machines, logotypes, etc.

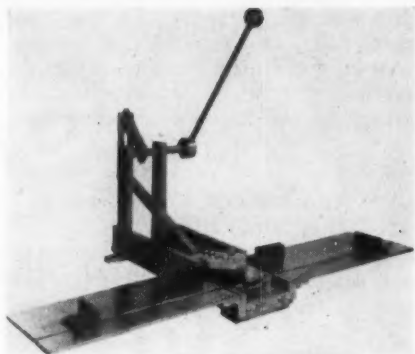
New Method Steel Stamps also maintains complete facilities for production marking, precision engraving and profiling.



Free 12 page illustrated catalog describes complete line of marking devices and facilities for production marking, precision engraving and profiling. Available on company letterhead from New Method Steel Stamps, Inc., 147 Jos. Campau, Detroit 7, Michigan.

Machine Notches up to 15-Gauge Sheet Metal

U. S. Tool & Die, Inc., 4 N. Main St., Sharpsburg, Pa., has announced the Rhodes Universal Notcher which is designed for making a wide variety of notches and other cuts in sheet metal up to 15-gauge thickness. According to the manufacturer, the machine will cut to a length and width of 3 in., to equal a linear cut of 9 in., and can be used for 90-degree corner



Rhodes Universal Notcher

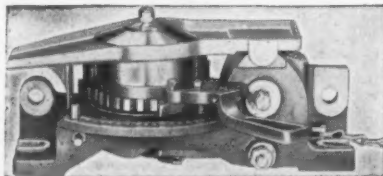
Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.



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**NIELSEN TOOL &
DIE COMPANY**
P. O. Box 1067
Berkley, Mich.

MODEL H AUTOMATIC Chuckling & Indexing Fixture



1. 1800 light cuts per hour.
 2. Either horizontal or vertical position.
 3. Collets changed instantly.
 4. Automatically knocks piece out.
 5. Ratchet or degree indexing — degree indexing added later if desired. Capacity 1".
 6. Automatic indexer also added later.
- Model F—Both degree and ratchet indexing.
Capacity up to 2 1/4".

Write for Folders

J. W. DEARBORN • Ansonia, Conn.

cuts of 3-in. lengths, 90 and 115-degree vees, corner and angular reliefs, various notching cuts and many other nibbling and cutting operations. The bench-type machine is equipped with two 14-in. long steel tables, each with a side stop and end stop which can be quickly positioned from a master template for making large numbers of identical cuts. Actual shearing is accomplished by hardened and ground tool steel shear blades and the dies, which can be easily changed.

Operation of the machine is by slight hand pressure on a lever, and a cutting pressure of 2,600 lb. is developed. Hand operation is standard; however, the machine can be furnished equipped for manual foot operation or air operated by means of an air foot pedal. Standard equipment in-

HIGH SPEED DRILLS

FLAT TWISTED AND ROLLED SECTION

Special Lengths and Types. Prompt Delivery.

Manufacturers Since 1903

HI-DUTY DRILL WORKS
FLEETWOOD, PA.

cludes one universal die or one angle die of 90, 60, 50 or 30 degrees. Other dies are available as extra equipment. The machine weighs approximately 50 pounds.

Adjustable Clamp Provides 8,000 P.S.I. Equalized Pressure

For all operators of machine shops, fabricators and other establishments using drill presses, milling machines, boring mills, and so on, Safety-Adjustable-Hold-Down Clamp Co., 600 Albany St., Brunswick, Ga., has announced an adjustable clamp which is said to provide 8,000 p.s.i. equalized pressure with compound leverage. The unit clamps to either the top or side of a T-slot table. To operate, the adjustable pins are set, the work is inserted and the leverage wheel is turned. The clamp is available in a 12-in. model designed for heavy-duty indus-

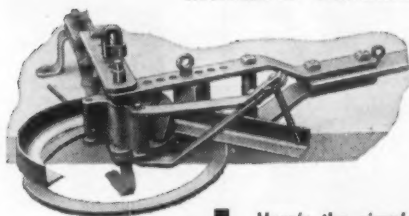


Safety Adjustable Clamp in use

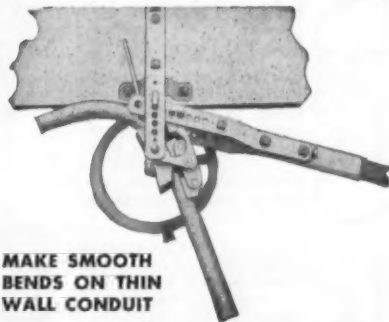
trial production, a 6-in. model for general machine shop use and a 4-in. model for smaller shops.

one man one bender with **HOSSFELD** **UNIVERSAL** **ATTACHMENT** **IRON BENDER**

BEND Angle Iron
INWARD or **OUTWARD**



**Bends Flat,
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Angle
and Pipe**



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BENDS ON THIN
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Here's the simple solution to two of your most difficult bending problems . . . angle iron and conduit. These special attachments for your HOSSFELD Iron Bender bend these special materials neatly, quickly, accurately to your exact specifications . . . a smooth, easy, one-man operation. Ask about the HOSSFELD Hydraulic Attachment that gives you complete mechanical operation.

GET ALL THE FACTS! WRITE TODAY!

HOSSFELD MFG. CO.

402 W. 3RD STREET

WINONA, MINNESOTA

Self-Contained Automatic Drill Unit Can Be Used in Variety of Setups

Identified as the Series 24, a self-contained automatic drill unit which operates on a very low volume of air has been announced by The Dumore Co., 1311 Seventeenth St., Racine, Wis. Simple to set up, the unit requires only two outside connections—conventional shop air and electric power—and can even be operated by

a small portable air compressor. A specially designed hydraulic control accessory (an optional feature), which controls the rate of feed, is available for drilling hard materials at special angles or on curved surfaces, and so on.

The Dumore Series 24 Automatic Drill Unit is mounted by the nose bracket, thereby reducing setup costs and time. Completely eliminating the need for relays, switches and valves, all of which are built in, the unit can be mounted in any combination—radial, vertical, inclined, opposed or

F
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and **SENSE . . .**
DO YOU PREFER HAND FEEDING

OR automation

PRECISION automatic
FLEXOPRESS is the answer!

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Cheaper . . .

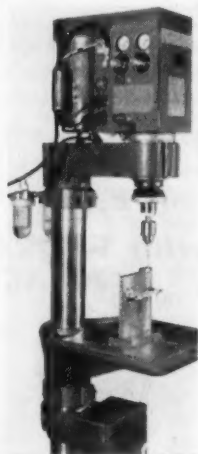
One Precision Automatic Flexopress eliminates extra hours, costly overhead, crowded floor space, hand operators and useless tools. Precision Automatic Flexopress accelerates production with its 350 to 600 strokes per minute.

The swing to **AUTOMATION** is on throughout all industry to find better ways of making operations more automatic. It is **DEFINITELY** the economic war on production costs today. Are you ready to meet competition?



15
30
50
TONS

HIGH SPEED



Dumore Series 24 Automatic Drill Unit equipped with repeat cycle timer attachment for deep-hole drilling operation on a brass part

angular — in standard brackets. If it is necessary to move the unit the bracket can re-

PRECISION WELDER & FLEXOPRESS CORP.

134 E. McMICKEN AVE.

CINCINNATI 10, OHIO

main in place, thereby retaining the setup for future production.

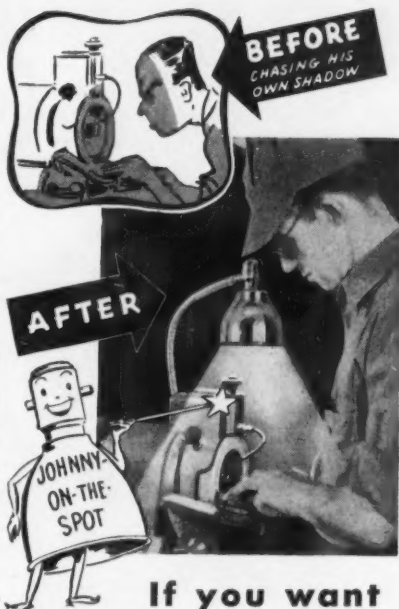
Measuring 8¾ in. in width x 15 in. in height and having an overall length of 23¼ in., including the chuck, the unit weighs 88 lb., including the motor. It has ten spindle speeds, ranging from 440 to 7,400 r. p.m. Driven by a timing belt which eliminates slippage and decreases friction, the unit is available with either a ½ or ⅓ h.p. motor with vary-



Two Dumore Series 24 Automatic Drill Units mounted horizontally for drilling No. 52 and ½-in. half holes on curved o.d. and i.d. of aluminum outboard motor choke knobs

ing voltages. Chuck capacity ranges from No. 60 drill to ¾ inch. For synchronizing the stroke of the unit with indexing fixtures, sequence operations, and so on, a synchronizer auxiliary circuit is built into the unit and is part of the standard equipment.

In addition to its prime function as a drill unit with conventional chuck attachments, the unit can be converted to such operations as tapping, reaming, deburring, centering, counterboring, spot-facing, countersinking, hollow milling, and so on. For



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Improved "on-the-spot" lighting gives eye-ease to machine production. Operators SEE better . . . and WORK better.

Machine designers specify VIMCOLights as insurance of continued high rated performance regardless of general plant lighting. Install VIMCOLights, they make your machines "light independent."

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All Standard Models Underwriters Listed

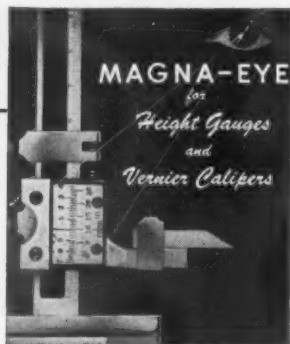
VIMCO MFG. CO., Inc.

Since 1919

111 Brayton St.

Buffalo 13, N. Y.

deep-hole drilling, an electronic repeat cycle timer is available to clear chips and to permit coolant to reach the drill point in deep holes. The drill unit can be mounted on standard drill press columns. A trip control for one head in any multiple set-up can be individually cycled for control operations.



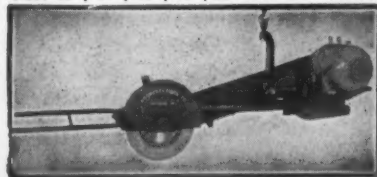
MAGNIFIES the "hard to read" vernier scales on calipers and height gages. No more eye strain, guess work or hit or miss setting and reading. LENS is finest quality optical glass, specially designed and ground for the purpose with utmost optical skill. 4X magnification shows lines true and correct. In daily use in plants of Westinghouse, General Electric, General Motors, Chrysler, Packard, Ford, Boeing Aircraft, Bendix Aviation and many others engaged in defense work. Made in 3 sizes to fit Starrett, Brown & Sharpe, Lufkin Tools, and others of similar design. S No. 100 for 6" Vernier Calipers; S No. 200 for 10"-12" Height Gages, also 10"-18"-24" Vernier Calipers; S No. 300 for most popular type 18" and 24" Height Gages and for 36"-48" and 60" Calipers.

For Complete Information Write, Phone or Wire

STEBAR COMPANY
711 W. Lake St. Minneapolis 8, Minn.

MUMMERT-DIXON SWING FRAME GRINDERS

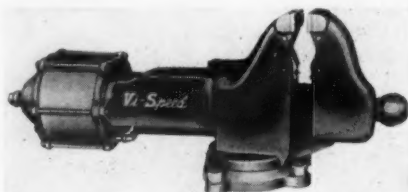
Sizes 12", 14", 16", 18", 20" and 24" wheels.



Ask for Descriptive Circular
MUMMERT-DIXON CO.
120 Philadelphia St. * Hanover, Pa.

Combination Air Vise Has 6-Inch Stroke

Designated as the Vi-Speed Model 1000-6, a long (6 in.) stroke, combination air vise which is a heavy duty



Vi-Speed Model 1000-6 Combination Air Vise

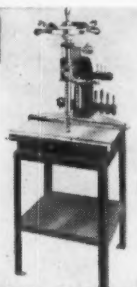
unit for conventional holding with 6-in. jaw faces, plus removable pipe jaws located in the lower portion of the jaws, has been announced by Van Products Co., 3770 W. 12th St., Erie 2, Pa. The hardened pipe or vee jaws can be easily removed for replacement with the same or other types of fixtures, converting the unit into an all-purpose vise and press. According to the manufacturer, the jaws open to 11 in. and will hold up to 6-in. diameter material in the vee jaws. The vise is powered by an 8-in. air cylinder, with a 50:1 ratio, on any line pressure up to 150 p.s.i. The air stroke is said to be completely adjustable from 0 to 6 inches. The vise is mounted on a swivel base and is supplied complete with all controls, including positive safety features.

LASSY

TAPPING MACHINES

are used
for testing taps
by three
leading tap
manufacturers

LASSY TOOL CO.
PLAINVILLE, CONN.



Four-Way Control Valve Is Available for Hand or Foot Operation

Airmatic Valve, Inc., 7317 Associate Ave., Cleveland 9, Ohio, has announced a four-way valve available for either hand or foot operation and featuring built-in, full-capacity, flow-control meters of the Venturi type. An air and low-pressure hydraulic valve specifically designed for the control of double-acting air or hydraulic cylinders, the unit is ruggedly built for heavy-duty service and long operating life, and is equipped with one balanced spool using renewable "O" ring type of packing. The flow control meters permit full-line volume without loss of pressure. Line-pressure variation, it is claimed, will not affect valve function.

The basic valve is also available for remote pilot operation, with cam, single or double solenoid together



Airmatic Four-Way Valves

with time-delay features. Non-corrosive throughout, the valve is offered in four standard pipe sizes— $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$ and $\frac{3}{4}$ in. — for air, oil or water in pressures from 0 to 150 pounds.

USE
ACME
RED OR BLUE LABEL
PRECISION
DOWEL PINS

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SAFEGUARD
EXPENSIVE DIES AND
MACHINE PARTS

Acme Dowel Pins break before bending or mushrooming—thus saving expensive equipment from ruin through misalignment. Order standard sizes from stock. Attractive prices on special sizes and large quantities.

Acme Industrial Company

Makers of Standardized Jig & Fixture Bushings

212 N. Laflin Street • Chicago 7, Illinois

THE SERVICE SHOP TO INDUSTRY FOR MORE THAN 25 YEARS

Bench Micrometer Provides for 0.0001-Inch Readings

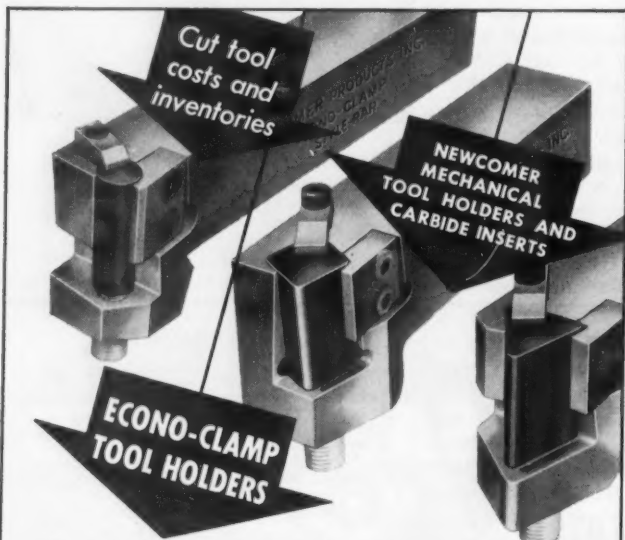
For precision work in the screw machine, watch, instrument and related industries, George Scherr Co., Inc., 200-MM Lafayette St., New York 12, N. Y., has announced a bench micrometer which reads in 0.0001 in. directly on a 1-in. diameter thimble graduated in 250 divisions. The micrometer head is "Lustro-Chrome" dull



Type No. 40G (left) and Type No. 40H (right)
Bench Micrometers

finished for easy reading and for the prevention of rust. The micrometer screw has hardened and ground threads. The instrument is available in two models; namely, the Type No. 40G and the Type No. 40H. The Type No. 40G has a throat depth of 1.600 in. and tungsten carbide tipped measuring surfaces. This type has a range of from 0 to 0.400 in. and a heavy base to assure steadiness when checking delicate precision parts.

The Type No. 40H has a non-rotating plunger-type spindle which, it is claimed, will adapt 11 different interchangeable sets of anvils of various shapes. This type instrument has a range of from 0 to 1 in. (reading in 10ths), a throat depth of 1.280 in. and a solid heavy base.



...for triangular, round & square carbide inserts

Newcomer Econo-Clamp Tool Holders provide a short-cut to economical production... machine down-time for tool grinding is minimized because multiple cutting edges on inserts can be utilized! Positive dual clamping features provide easy, quick and accurate indexing.

Econo-Clamps use standard full-length inserts or the more economical, short Newcomer "Throwaway" Carbide Inserts together with a hardened steel base anvil.

Newcomer Ad-Clamp Tool Holders are also available for use with standard rectangular blanks or the more durable Newcomer Step-Tip Blanks.

Send today for Newcomer Catalog 109-54!



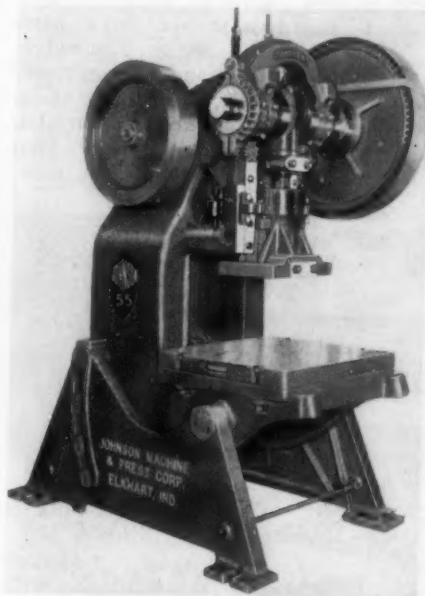
NEWCOMER PRODUCTS, INC.

LATROBE, PENNSYLVANIA

General Sales Office: 512 Franklin Ave., Pittsburgh 21, Pa.

Punch Presses Have Capacities of 27, 43 and 56 Tons Respectively

Three models of open back inclinable punch presses of particular interest to die-cast trimmers, large light sheet and aluminum sheet users have been announced by Johnson Machine & Press Corp., 620 W. Indiana Ave., Elkhart, Ind. The Model 33 is a 27-ton capacity unit with a standard 2½-in.



Johnson Model 55 Punch Press

stroke and an optional stroke up to 6 inches. The unit weighs 4,200 lb. The Model 44, a 43-ton press, has a standard stroke of 4 in., with a stroke up to 8 in. available on special order. This model is offered in a flywheel type rated at 105 strokes per minute and a back geared type with 46 strokes per minute. The weight of the press is 8,500 pounds.

The 56-ton capacity Model 55 has a standard 4-in. stroke, with 9-in.

FLYNN

FOR 35 YEARS THE LEADING NAME IN BORING HEADS



15 MODELS

Flynn has studied boring head applications for many years—builds a size and design for every job with all the wanted features. Machinists with real appreciation for quality and precision prefer Flynn.

FLYNN

MANUFACTURING CO.

133 Flowerdale
Ferndale 20, Mich.

Write for our catalog



stroke available on special order. This model is furnished in a flywheel type delivering 100 strokes per minute and a bull gear type with 45 strokes per minute. The machine weighs 10,000 lb. Two types of clutches are offered for all models of presses; namely, a pin clutch and an air clutch.

Valve Provides Safety in Press Operation

Designated as the "Lifeguard," an air control valve which is said to

"sense" valve malfunctioning and shut itself off when any component does not operate normally has been announced by Ross Operating Valve Co., 120 E. Goldengate Ave., Dept. 1904, Detroit, Mich. The heart of the safety feature is a "cut-off" unit attached to the pilot section casting that cuts off the air supply to the pilot section in case of failure of any valve part. The valve cannot be actuated again until the seal on the recock unit is broken, the valve is inspected and necessary adjustments have been

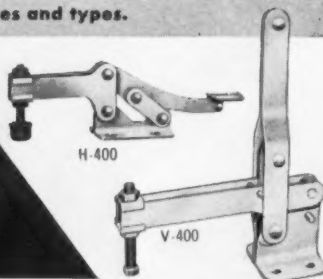
made. The valve, an a.c. solenoid, pilot operated, three way model, consists of two valves in a com-

TOGGLE CLAMPS With added valuable feature — now offered to you as part of the broad line of KNU-VISE Toggle Clamps—in many sizes and types.

they're
NON-CORROSIVE!

they're
NON-MAGNETIC!

they're of
STAINLESS STEEL!

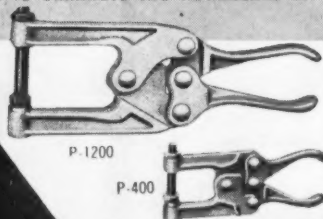


TOGGLE PLIERS Here is the KNU-VISE answer to your need for a portable clamp to eliminate the headaches in spot welding aluminum.

they're
NON-MAGNETIC!

they're
NON-CORROSIVE!

they're of
K-MONEL!
(stronger than steel)



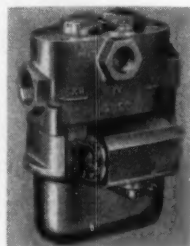
Both the clamps and pliers are also available in aluminum, on special request.

Sales offices in principal cities—Teletype DE 49

**KNU-VISE
PRODUCTS**

LAPEER MFG. CO.

3048 DAVISON ROAD • LAPEER, MICHIGAN
WESTERN DIVISION: 422 MAGNOLIA, GLENDALE, CALIF.
CANADIAN DIVISION: HIGGINSON ENGINEERING, HAMILTON, ONT.



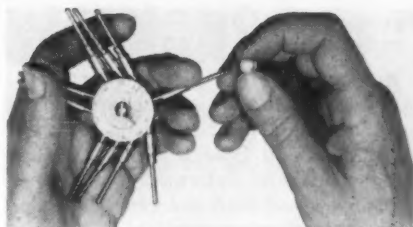
Ross "Lifeguard" Air Control Valve

mon housing combined with the cut-off unit. It has a single inlet port, a single cylinder or out port and two interconnected exhaust ports. There are two pilot sections with a common air supply, but with individual exhaust ports and solenoids.

The valve operates at up to 600 cycles per minute. Main valve pressures range from 30 to 125 p.s.i.g. air, with pilot pressure of from 40 to 125 p.s.i.g. air. Maximum operating temperature is 175-deg. F. Operating voltage, plus or minus 10 per cent, is rated at 115 volts.

Multiple Gage Increases Output of Bore Grinds

Known as the Microsphere Multiple Precision Gauge, a unique gaging device, specially designed to increase the output of bore grinds has been placed on the market by The Merz Company, Box No. 24605, Village Station, Los Angeles 24, Calif. The device consists of 12 measuring spheres in any increment desired starting at 0.0001 in., and can be used to make an immediate check of the size of the hole being produced during any part of the operation.



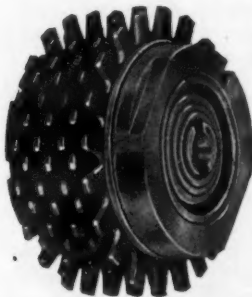
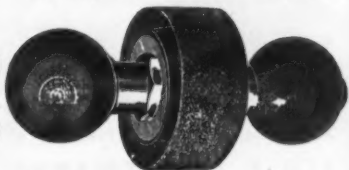
Microsphere Multiple Precision Gauge

Of simple design to allow for easy use by inexperienced operators, the Microsphere Gauge utilizes the principle of a sphere as the measuring element. These spheres are manufactured to an accuracy of plus 0.000000 and minus 0.000025 in., and can be obtained in both tool steel or hard chrome. They are available in standard sizes ranging from $\frac{1}{16}$ in. up to $\frac{1}{2}$ in. in increments of $\frac{1}{64}$ inch. Special sizes of spheres can be obtained on order.

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FAST CUTTING ACTION

Balanced . . . Free Running . . . High Speed
Crushing and Wheel Forming Action . . .
For SHARP, CLEAN, OPEN WHEEL FACES



MODEL 1943 CC ASSEMBLY

STEEL CUTTERS
For Surface
Grinders, etc.

Complete
Assembly \$ 7.50
Extra Wheel \$1.35

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**SAW SHARPENING and
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HANCHETT MANUFACTURING CO.

BIG RAPIDS, MICH.

MM-112

PORTLAND 1, ORE.

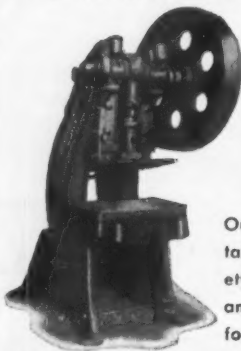
Power Feed Available for Cutting Heads of Stone Saws

Stone Machinery Co., Inc., 819 Fayette St., Manlius, N. Y., has announced a power feed for the cutting heads of all chopstroke type Stone saws. The completely semi-automatic power feed operates by air with one simple control. The attachment is available either as an accessory for present saws or as optional equipment on all new Stone sawing machines. According to the manu-



Stone Sawing Machine equipped with Power Feed Cutting Head

RECLINABLE POWER PRESSES



Ideal for general stamping work . . . 4 to 100 tons capacity. Can recline to 40° with perfect safety.

Our catalog contains a wide variety of press types and sizes. Write for it today.

*50th year serving worldwide industry with Patent Percussion, Open Back, Double Crank, Punch, Horn, Toggle and Straight Side Presses, Dial and Roll Feeds.

ZEH & HAHNEMANN CO.
190 VANDERPOOL ST. NEWARK 5, N. J.

facturer, the power feed cutting head increases production, minimizes operator fatigue and increases wheel life from 10 to 25 per cent, depending on the metal cut. It is also said to enable a uniform cutting speed of four seconds per square inch of metal cut.

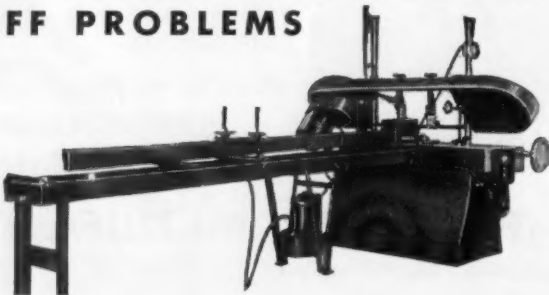
Pedestal Is Available for Blake Tap Chamfer Grinder

Edward Blake Co., 438 Cherry St., West Newton 65, Mass., has developed

SOLVE CUT-OFF PROBLEMS

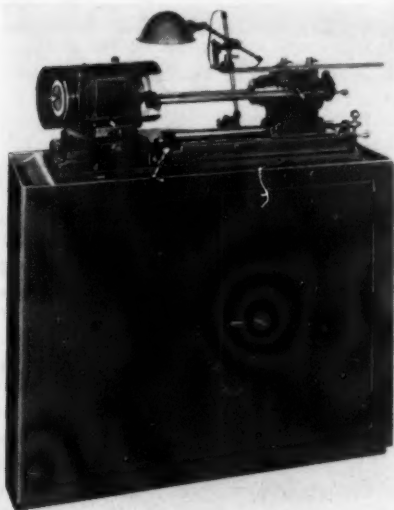
Do a REAL job—faster and at lower cost. Our Models M, D, and J feature simplified hydraulic controls for both full and semi-automatic operation. Bar feed (shown here on Model M), other accessories, and hinge-type saws also available. Write for literature.

W. F. WELLS & SONS
Three Rivers, Mich.



a pedestal for mounting its tap chamfer grinder. The pedestal is of modern cabinet style with two doors at the front and an interior shelf for convenient storage of accessories. The rugged steel construction of the pedestal is said to minimize vibration, and the cabinet sits solidly on the floor, although it can be lag-screwed into place if desired.

The pedestal top is recessed slightly at both ends to provide a "pocket" so



Blake Tap Chamfer Grinder mounted on pedestal

that taps will not roll off. The door handle is equipped with a sturdy lock so that items placed inside can be safeguarded against tampering or pilferage. Overall dimensions of the cabinet are 40 in. wide x 15 in. deep x 34 in. wide.

According to the manufacturer, the design of the cabinet makes it an appropriate pedestal for use with both the No. 1 and No. 2 models of the Blake Tap Chamfer Grinder. The pedestal is painted the same color as the machine.

GAMMONS

TAPER REAMERS for all types of die work



- Specially treated for modern die steels.
- Rapid cutting capacity.
- Large range of standard sizes.
- Tapers per inch: .005, .008, .013.

GAMMONS • HOAGLUND CO.
MANCHESTER 2, CONN.
Manufacturers of helical taper pin, chucking,
die makers and special reamers.

**Lathe Attachment Trues Work-
pieces to Tolerances Within 0.0001
In. Total Indicator Runout**

Sanford Mfg. Corp., 1022 Commerce Ave., Union, N. J., has announced a precision attachment with which practically any lathe chuck, faceplate or special fixture can be used to provide accurate concentricity. Work-piece tolerance to within 0.0001 in.

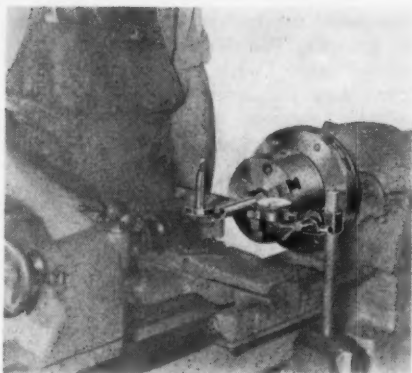


Illustration showing Sanford Auto-Truer in universal chuck setup

CAMS

MADE TO YOUR SPECIFICATIONS

— Except Screw Machine Cams —

Design Assistance Offered

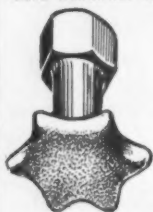
KIDDE PRECISION TOOL CORP.

37 Farrand St. Bloomfield, N. J.

REID

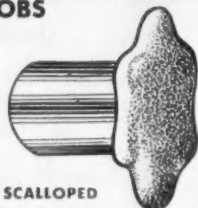
TOOL ROOM ACCESSORIES

C.I. HAND KNOBS

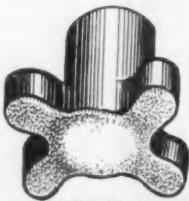


**LONG SHANK
With Wrench Hex.**

Three styles. Many sizes. Made of fine grain cast iron. Smooth finish. No sharp edges. Low prices. FREE 52 PAGE CATALOG on request describing dozens of items needed in tool room. Top quality. Lowest prices.



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PRONG

REID TOOL SUPPLY CO.

Muskegon Heights, Michigan

CUT TOOL COSTS broken tools made like new again with **NU-TANGS**

Twisted or broken tangs replaced at low costs on any tool with a Morse Taper (sizes 1 to 6). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

NO WELDING! NO SLEEVES!

NO SHORTENING! NO DISTORTION!

**GUARANTEED
STRONG AS NEW!**

Send them to us like this!

We'll return them like this!

NU-TANGS INC. 1339 Bates Avenue Cincinnati 25, Ohio

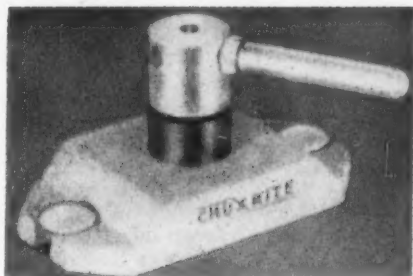
stopped and the Auto-Truer is locked into position for precision operation, all in a matter of seconds.

The Auto-Truer is available for all standard lathes of from 6 to 12-in. swing.

Rapid-Action Collet Vise Is Designed for Holding Cylindrically-Shaped Parts

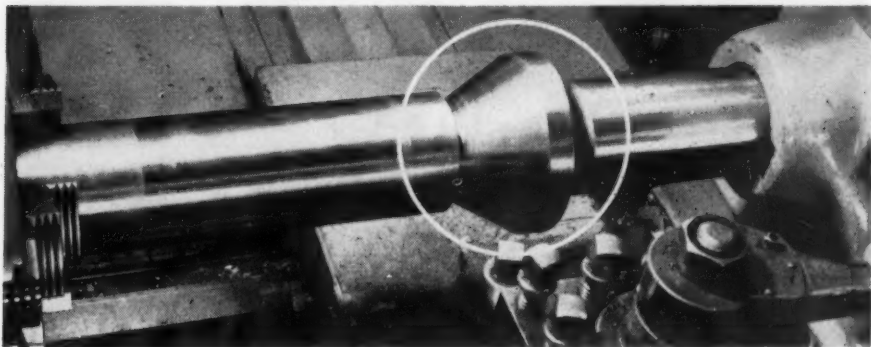
Designated as the "Chuxrite," a rapid-action collet vise which is designed for holding cylindrically-shaped parts up to $\frac{1}{4}$ in. in diameter has been announced by Foredom Electric Co., 27 Park Place, New York 7, New York.

According to the manufacturer, the unit speeds setups on both short and long-run secondary operations on drill presses, tapping machines, lathes and milling machines. The unit may also be used on a bench for assembly



Foredom "Chuxrite" Rapid-Action Collet Vise

work, polishing, cleaning, and so on. A partial turn of the handle, which is attachable in any of three different positions, locks the work in place. An opening in the base prevents chip clogging and permits finished parts to drop out when the chuck is released. Seven sizes of collets are available, providing a range of from $\frac{1}{16}$ to $\frac{1}{4}$ in. in increments of $\frac{1}{32}$ inch.



**ROOFE LIVE CENTERS
ASSURE
MAXIMUM ACCURACY!**

Users everywhere praise ROOFE Live Centers for increasing production, lowering costs and for giving maximum accuracy.

Made of the finest alloy steels, standard types are available in Morse Taper, Brown & Sharpe, Jarno, straight or special shanks to your specifications. Write for catalog.

Reliable distributors wanted.

HOUSTON GRINDING & MFG., CO., Inc.

2110 QUITMAN STREET • HOUSTON 10, TEXAS

Device Raises Parts in Storage Drums to Efficient Working Height

Known as the "Drumvator," a device for raising parts in storage drums to efficient working height, thereby eliminating the time loss and operator fatigue which result from repeated reaching down into the parts drum and lifting the parts to the correct work height, has been announced by Actron Engineering Co., 11934 Lor-

rain Ave., Cleveland 11, Ohio. The device, which can be used conveniently at any press or machine station since it is contained within the parts drum, consists of two separate assemblies — a hoisting frame and a stem and platform assembly.

In use, the stem and platform assembly is dropped into the drum which will receive the parts. The machine operator can fill the drum above the platform with processed parts

with or without the hoisting frame in place. When the operator has filled the drum, the frame



Cutting costs in these times is a good trick if you can do it. You can, on plates requiring detail marking, by using an Automark Electric Metal-Marking Typewriter. The operator lightly touches the key and the Automark does the rest, quickly and automatically. No dial to turn—no lever to pull. Marking output is increased five times and worker fatigue is greatly reduced. Write today for Bulletin 8-16.

AUTOMARK Electric Metal-Marking **TYPEWRITER**

Manufactured Exclusively By

DEFIANCE MACHINE & TOOL COMPANY

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AGENTS
Desirable territories open for responsible representatives. Write giving complete information, lines carried and territory covered.



"Drumvator"

can be quickly slipped over the stem to be in position to raise the parts to a convenient level for the subsequent operation. If there is a temporary storage prior to the next operation, the parts may be stored with

the stem and platform in place. The stem and platform assembly may be obtained separately, and the stem is collapsible to the height of a standard drum to allow for stacking or the use of drum covers while in storage.

Operation of the device is accomplished by moving the rubber-grip hand lever on the hoisting frame. This action raises the stem and platform assembly; consequently, the parts may be elevated as required. The standard unit has a 2,000-lb. lifting capacity. To prevent parts from jamming in ribbed style drums, a thin sheet metal liner can be either supplied with the Drumvator or made by the user. Clearance for a 22-gauge liner is allowed on the diameter of the platform. The standard diameter of platform is approximately 22 1/4 in. and fits a standard 55-gallon drum.

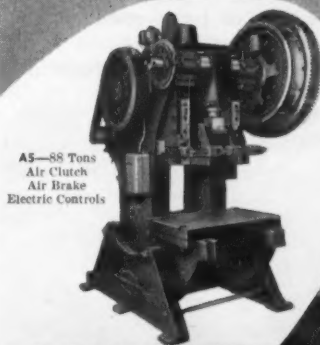
Brake Is Capable of Forming Practically Any Shape

A hand-operated universally adjustable sheet metal brake capable of forming virtually any shape has been introduced by R. E. Smith, 1122 Elizabeth Ave., Waukegan, Ill. The unit is compactly built, occupying only 30 x 40 in. of floor space, yet will accommodate 18 gauge sheets up to 26 in. wide or progressively narrower widths and thicker gauges up to 3/8-in. mild steel 1 1/4 in. wide. It is claimed that 180-degree flanges up to 1 1/4 in. wide may be formed in one operation without repositioning the work. Wider flanges can be formed to any angle up to 164 degrees.

The brake is equipped with segmented upper mandrel fingers whose radius is 1/32 in.; however, fingers of any radii up to 1/2 in. can be furnished. Adjustments at the hinges quickly and easily change the distance of the lower anvil fingers from the center line to accommodate changes in material thickness and bending radii.

**Backed by nearly
a half century of
dependable performance**

**... yet modern to the minute
for today's exacting demands.**



AS—88 Tons
Air Clutch
Air Brake
Electric Controls

- Engages smoothly; no sledge hammer blow.
- Inched, single stroke, or continuous.
- Less heat as brake is released when clutch is engaged.
- Less current used; brake is off when clutch is engaged.
- Clutch torque output in direct ratio to applied air pressure and controlled by regulator valve.
- Two run buttons, one stop button, one inch button operate on 110 volt regardless of motor current (220 or 440).
- No back lash when using air cushion or heavy spring pressure pads.
- Clutch is reversible. (By reversing wires on motor you can inch out of stall).

Robinson Presses are available (in either pin type or air clutch models) in sizes from 32 to 88 Ton.

Write for illustrated
brochure and
specification sheet.

R

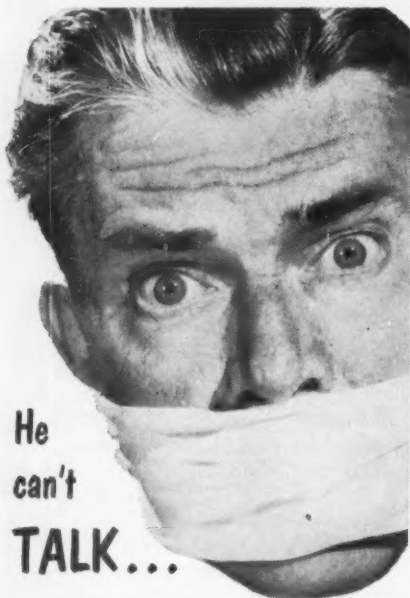
OBINSON

PRESSES

NEW ALBANY MACHINE MFG. CO.
NEW ALBANY, INDIANA

Pans can be formed 1¾ in. deep and from 1 to 26½ in. wide by proper selection of upper mandrel fingers. Selective bending of portions of a sheet, such as flanging the inside of a square or rectangular hole, or the square throat of an elbow, is accomplished by removing any of the lower fingers that would distort the sheet while the bend is being made.

From the operating position at the end of the brake, the operator has



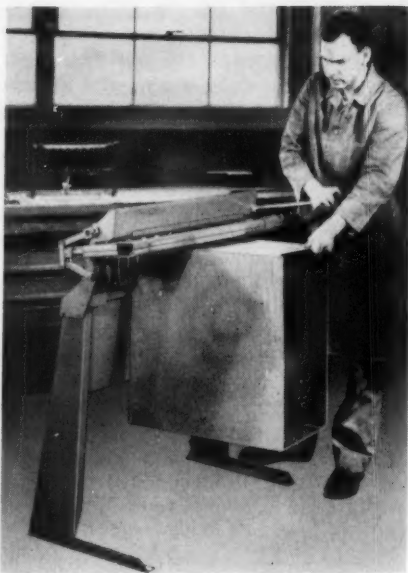
He
can't
TALK...

(So we'll say it for him.) The ingenious new SMITH'S "Flo-Trol" design eliminates back-fire and prevents burned-out valve seats in Smith's oxy-acetylene cutting torches. It's fool-proof. You can't go wrong.

Write us a card —
we'll give you the facts.

SMITH WELDING EQUIPMENT CORPORATION

Dept. MMS-111, 2633 S. E. 4th St., Minneapolis, Minn.



Smith Hand-Operated Sheet Metal Brake

full visibility of each side of the machine and the work to assure maximum working efficiency and accuracy. Fast, accurate positioning to a mark and positive holding of the sheet being formed are effected through the use of a spring loaded mandrel which toggles down on the sheet when the locking lever is moved slightly outward. Inward pressure on the same lever instantly releases the mandrel and the work can be re-



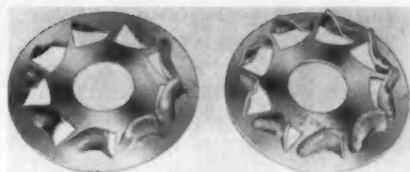
DRILL THESE HOLES
BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.

moved. An angle stop and a back gauge are provided to ensure exact repetitive bends of flanges to any angle for the production of drive cleats, S-cleats, duct cleat edges, government locks, double hems, sliding door track, square and round tube, and any other shape devised.

Attachment Minimizes Wheel Heat in Surface Grinding Operations

Magic City Machine Tool Co., 817 E. Charles St., Muncie, Ind., has developed an economical and quickly installed Magic Wet Wheel Attachment designed to minimize wheel heat in the performance of surface grinding operations. An adjustable sight feed with connected tubing places approximately a drop of coolant a second into a ("Flying Saucer") specially louvered disc fitted against the back of the wheel which gathers air,



"Flying Saucers" forming part of Magic Wet Wheel Attachment

compresses it and forces the moisture through the wheel, coming out at the periphery and point of contact in a fine, quickly evaporating cold mist. Another disc ("Flying Saucer") with air foils on the front of the wheel creates a low pressure or suction through the porous structure of the wheel, helping to further distribute the moisture.

The compression and expansion developed through the wheel create a type of refrigeration that aids in keeping the workpiece cool.



MODEL B

AIRKOLET CAPACITY:

Hexagon—pads $\frac{3}{8}$ " to $1\frac{1}{2}$ ",
solid collet $\frac{3}{8}$ " to $1\frac{7}{8}$ ".
Round—pads $\frac{3}{8}$ " to $1\frac{7}{8}$ ",
solid collet $\frac{3}{8}$ " to $1\frac{7}{8}$ ".
Supplied with one set of
soft pads, or one solid col-
let for round or hex parts.

Production Tested

THE NEWEST . . . MOST COMPACT

AIRKOLET Chuck

PATENT PENDING

- For Indexing Tables, Milling Machines, Drill Presses
- Holds Rough Castings . . . Registers Exactly Each Time
- Ideal Where Tolerances to $\frac{1}{16}$ " Required for Castings

AIRKOLET Chuck has been production tested on indexing tables for over a year, on millions of parts varying widely in sizes and shapes. Holds parts for turning, drilling, reaming, chamfering, threading . . . registering exactly each time. Ideal for castings where tolerance variations up to $\frac{1}{16}$ " are needed to eliminate much unnecessary grinding.

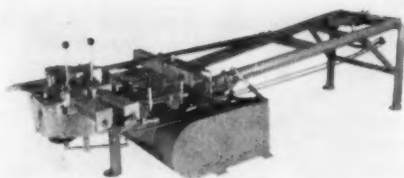
Write today for our Bulletin T101 and Prices

PITT INDUSTRIES

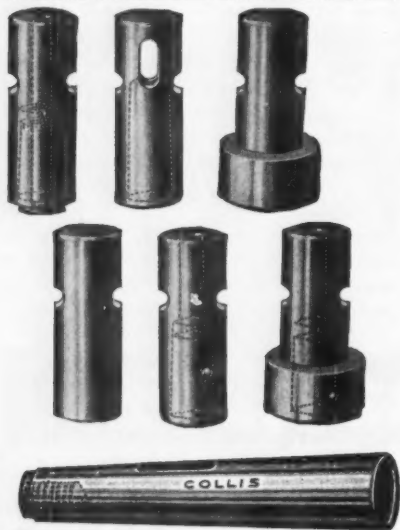
DEPT. MMS, CARNEGIE, PA.

Right and Left-Hand Bending Machine Has Dual Controls

Designed as the No. 800-2", an entirely self-contained bending machine for production or custom bending applications has been brought out by Wallace Supplies Mfg. Co., 1300 Diversey Parkway, Chicago 14, Illinois. Designed to bend both right and left hand, the machine has dual controls for the operator's convenience and is



Wallace No. 800-2" Bending Machine



COLLIS COLLET EQUIPMENT

★ COLLIS Equipment fills today's important production needs so well because they are made by men skilled in making this type of equipment. Supply the proper unit from a complete range of types and sizes for Drill Sleeves and Sockets, Lathe Centers, Chuck Arbors, and Drill Drifts. We will handle your orders promptly.

THE COLLIS COMPANY
DEPT. A, CLINTON, IOWA

provided with ample clearance for bends on more than one plane. The unit has a capacity for 2½-in. o.d. x 0.065-in. wall steel tubing or 1½-in. standard pipe.

The Wallace No. 800-2" is built from welded steel sections, electrically arc welded. The motor, pump and storage tank, and so on, are located in the base of the machine. The machine bends to 180 degrees, both clockwise and counterclockwise. The bending head has an r.p.m. of approximately 8. The mandrel clearance is 8 ft. 6 inches. A degree of bend dial is mounted on the head, and an adjustable stop to control movement of the bending head is mounted on a disc located underneath the mainshaft.

Electronic Micrometer Reads to 0.00001 Inch

Brown & Sharpe Mfg. Co., Providence 1, R. I., has announced an electronic micrometer which is designed

LW POWER HACK SAWS

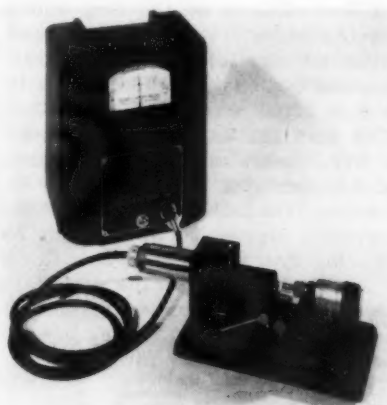
Only \$297.56

Send for free catalog on power hack saws, vises, magnetic chucks, dividing heads.

L-W CHUCK COMPANY
28 SO. ST. CLAIR STREET TOLEDO 4, OHIO



to measure small parts to 0.00001 in. at a magnification of 18,000 times. This magnification is said to be continuously variable from 1,800 to 18,000 times. A standard electronic amplifier and gage head cartridge are combined with a standard indicating bench micrometer. A frictionless member, supported by parallel reeds, transmits motion from the anvil to the gage head cartridge, and the micrometer head is set to the required 0.00001 inch. When the instrument is used for extremely fine measurements, its setting should be made to



Brown & Sharpe Electronic Micrometer

Johansson gage blocks or other precision gages.

An easily operated retracting lever provides for rapid placing of work between the measuring points. The micrometer pressure is readily clamped in position, and a small table of adjustable height is provided on which to rest the part being measured. Measuring pressure is said to be adjustable from 3 oz. to 2½ lb. when used at 0.00001-in. sensitivity, making it possible to use a measuring pressure suited to the requirements of the work being measured.

ECONOMY



*Another Name
For Precision—
Performance—Fit*

- ✓ "TRU-LOC" ADJUSTABLE
ADAPTER SLEEVES & NUTS
- ✓ A.S.A. DRILL JIG BUSHINGS
- ✓ A.G.D. PLUG & RING GAGES

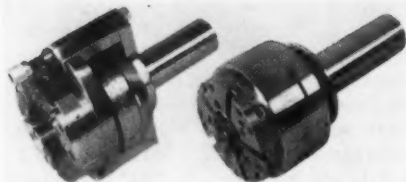
Prompt service on deliveries is a certainty at "Economy," with all items regularly stocked.

Economy
TOOL & MACHINE CO.

1827 S. 68th St., Milwaukee 14, Wis.

Insert Chaser Die Heads

The Eastern Machine Screw Corp., 40-50 Barclay St., New Haven 6, Conn., has announced the H&G Size 11005 Style DM Insert Chaser Die Head and the H&G Size 152 Style MM Automatic Insert Chaser Die Head. The light-duty Size 11005 Style DM die head is designed for use on No. 2 Brown & Sharpe automatics that have



(Left) H&G Size 11005 Style DM Insert Chaser Die Head. (Right) H&G Size 152 Style MM Automatic Insert Chaser Die Head

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Northwestern
 119 HOLLIER AVE., DAYTON 3, OHIO

1½-in. capacity spindles and for thread sizes ranging from 1⅛ to 1½ in., where pitches are not coarser than 18 threads per inch. The carriers and chasers of the Size 11005 have the same cross section as used in the 00 size die head; however, there are five chasers and carriers to the Size 11005 set.

The Size 152 Style MM die head has five chasers and carriers per set and a capacity of from ¼ to 1¼ in. diameter. This unit is designed for use on special classes of work, such as threading over keyways or slabbed off sections. According to the manufacturer, with the five chasers sets at 72 degrees instead of 90 degrees, no chaser is directly opposite another.

Collar Facilitates Truing of Diamond Wheels

Queen City Carbide Tool Co., 2339 Gilbert Ave., Cincinnati, Ohio, is now producing the "Easy-Tru" Collar, a

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Raymac drills cut hardened metal . . . do not burn or anneal. Feature operational speeds of 350 to 600 RPMs depending on size and hardness of metal.

Raymac solid carbide reamers are custom designed for individual jobs.

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 3729 CASS AVENUE, DETROIT 1, MICH.

EISLER CAM MILLING

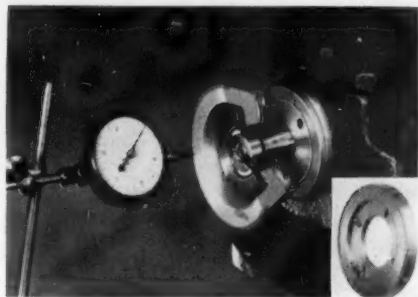
JIG BORING

A SPECIALIZED CAM MILLING SERVICE...

JIG BORING... SPOT WELDING... CONTRACT PRODUCTION

... EXPERIMENTAL DEVELOPMENT

EISLER ENGINEERING CO., Inc.
 734 So. 13th St. Newark 3, N. J.



"Easy-Tru" Collar for diamond wheels

device for truing diamond wheels accurately and speedily. According to the manufacturer, the collar eliminates paper shimming, extends diamond wheel life by preventing uneven wear and saves man-hours of truing time normally expended using hit-or-miss methods. Wheels can be trued to 0.0005 in. within minutes using the device, it is claimed.

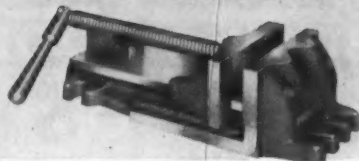
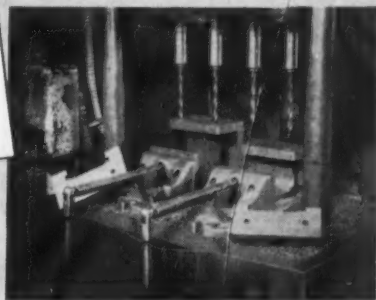
Four accurately machined, cone-point socket screws are spaced 90 degrees apart around the collar. A safety band slides freely over the outer surface of the collar, covering the screws during operation, and four holes in the band make screws accessible during the adjustment process. The collar flange fits snugly over the adapter, replacing the 1/4-in. adapter collar and thus bringing screw points in line with the forward face of adapter shoulder. The diamond wheel is then mounted conventionally. After checking wheel runout with a dial indicator, the screw or screws adjacent to low reading are tightened, throwing the wheel face out equal to high reading. After adjustment, the start-up acceleration of the wheel causes slippage between the ring and safety band, and the band is displaced automatically to cover the screws.

The Easy-Tru Collar is made in sizes to fit practically all adapters.

Here's PROOF that
~~SPEED VISE~~
is a fast production tool

Here's a production set-up on a multiple spindle semi-automatic drilling machine that is really cutting manufacturing time and costs. The use of two Speed Vises eliminates the need for expensive and complicated fixtures and at the same time increases the production range. With Speed Vise it is only necessary to make a simple jaw plate to fit the parts being machined and to hold drill bushings, etc.

- * Quick action design for speed. Opens instantly to full capacity to handle work of any size.
- * Standardized holes for attaching jigs or jaw plates.
- * Lift...slide...lock...that's all there is to the fast, positive locking action.
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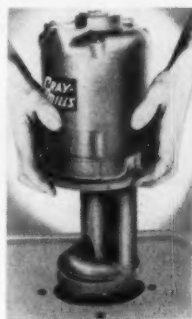
CARDINAL MACHINE CO.

1819 Dana Street, Glendale, California

Centrifugal Coolant Pump Is Compact in Design

Identified as the H-6000 Series, an immersion-type centrifugal coolant pump which is compact in design and yet delivers 17 gal. per minute at 12 ft. head with water has been announced by Graymills Corp., 3705 N. Lincoln Ave., Chicago 13, Ill. The pump is designed to handle liquids, even containing abrasives, through a

wide range of viscosity with ample reserve horsepower to prevent overloading the motor to cause pump failure. There is no pipe necessary below the self-mounting flange, and the discharge pipe is above the mounting flange. The unit is available in two standard immersion lengths, 6½ and 8½ in., which are said to be ample for practically all types of machine tools, machinery and for any special application. There is no metal to metal contact between moving parts, and the shaft and moving parts are enclosed and protected by the pump casting.



Graymills H-6000 Series Immersion-Type Centrifugal Coolant Pump

Columbia

TOOL STEELS for
all tools for all purposes



**HOT WORK-
SHOCK RESISTING:**

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Buster C.E.C.



**COLUMBIA TOOL
STEEL COMPANY**

Main Office & Works
Chicago Heights 6, Ill.

Circular Saw Blade Features Carbide Tips

Radial Cutter Mfg. Corp., 831 Bond St., Elizabeth 4, N. J., has announced the "Radialloy-tipped" Circular Saw Blade which is said to combine a high-quality heat-treated precision-ground steel blade designed to avoid vibrations at any speed with permanently

HIGH SPEED or CARBIDE

BORING TOOLS

For MASS PRODUCTION

**FOR HOLES FROM
1/16" UPWARD
17 DIFFERENT SIZES**

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LAPPED CUTTING EDGES
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**Dealers! Here's
a Profit-Maker!**

738-MM BROADWAY
NEW YORK 3, N. Y.

brazed, unusually tough, wear-resistant carbide tips. Each tip has full steel backing for maximum support, as well as a special safety lock designed to prevent the tip from flying off. The saw is designed for use on non-ferrous metals, including bronze and aluminum, as well as woods, plastics and composition materials.

Improved Grinders Feature Higher Starting Torque

Basic improvements in all single and three-phase models of its standard 7-in. grinders and buffers have been announced by Delta Power Tool Division, Rockwell Mfg. Co., 432 N. Lexington Ave., Pittsburgh 8, Pa. The improved models have been designed to offer higher starting torque, higher breakdown torque, lower operating costs and greater adaptability. The improved single-phase model features

a capacitor start motor in place of the split-phase motor, and all single and three-phase models, except the 550-volt machine, have been changed from single to dual voltage. In the single-phase model, the higher starting torque provided by the capacitor start motor is said to provide faster, easier starting, and the higher breakdown torque reduces stalling, especially in heavy grinding operations. The dual voltage feature, it is claimed, allows the single-phase machine to operate on either 115 or 230-volt current and the three-phase model (except the 550-volt unit) on 220 or 440 volts. An additional feature of the three-phase model is a separate toggle switch for the lamps which enables them to be turned on or off independently of the machine itself.

Other features of the improved models include oval-shaped motor and bells and an extended motor shaft



PERFORMANCE!

Modern industry demands TOP PERFORMANCE plus Economy from its production facilities. Both of these features are highly exemplified in this Standard Machine No. S. O. 4132.

Standard's 3 column hydraulic drilling, Counterboring and Taper Reaming machine is equipped with three Standard 25 H-P "DRILL-MASTERS," each column has 14-spindle head with tooling to suit successive operations. Fixtures are moved from station to station on a roller type conveyor. PART; SPROCKET. Operations: Drill, counterbore and Taper Ream Holes.

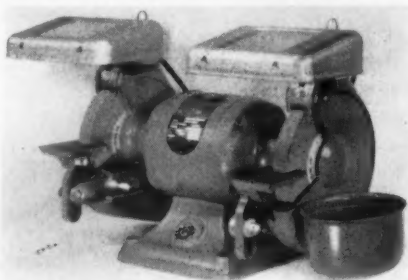
UNITED STATES SALES REPRESENTATIVES: ARNOLD J. WERNER CO., NEW CENTER BUILDING, DETROIT 2, MICHIGAN



**STANDARD
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which, together, combine the advantages of maximum rigidity and more working clearance around and between the wheels; fully machined and fully adjustable tool rests with working surfaces on both sides of the wheel; no-glare twin-light shields with double-thick safety glass and shielded bayonet-type bulbs lighting both sides and face of the wheel; single-stud shield mounting which enables the shield to be swung in and out of posi-

tion in one motion; adjustable spark guards; and natural fan action which



Delta Improved 7-Inch Grinder

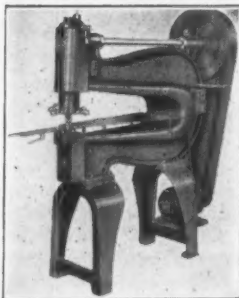
sucks in all dust and sparks and discharges both through a tube at the rear of the wheel.

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1001 jobs



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Knoxville Since 1885 Tennessee

PIONEER MFRS. OF NIBBLING MACHINES

Collet Releases Work Automatically

Royal Products, 87 Union St., Mineola, L. I., N. Y., has announced a self-releasing collet with a clover-leaf grind for use on lathes, collet fixtures, and so on. The collet embodies a design which permits the operator to release the collet and work automatically. According to the manufacturer, the collet has positive, "live" spring tension, opens wide for any given size work and requires no gage fitting for secondary operations. A wiping contact between collet and

READING BENCH KEYSEATER

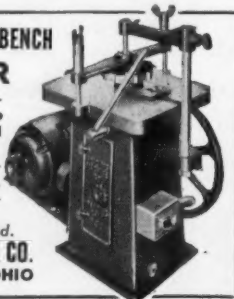
Portable—move directly to job; a time saver for both small and large shops.

3 3/4" stroke; adaptable for other work.

Low first cost — prompt delivery.

Good dealers wanted.

READING MACHINE CO.
CINCINNATI 37, OHIO





Royal Self-Releasing Collet

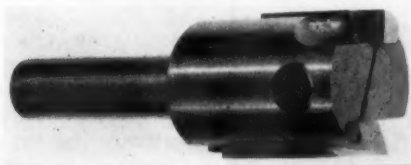
closing sleeve is produced with the opening action of the collet, eliminating possible error due to chips or dirt entering between the collet and sleeve.

The Royal Self-Releasing Collet is made of properly heat-treated, selected steel and is available in Styles 5C, 3C, 3AT and 6AT, in sizes from 1/64 in. to maximum capacity.

Holder Is Designed for Step-Form Milling

Designated as the Combo-Holder, a toolholder which is designed for step-form milling and boring, as well as for conventional use, has been announced by Econotool Co., Jenkintown, Pa. The holder accommodates standard tool bits made of either high speed steel, Stellite or carbide. The slot in the holder is ground to a close tolerance, thus permitting tools, ground to the same width, to be used interchangeably. The toolholder is made from heat treated alloy steel. Tools are on the center line, providing maximum tool support. The holder is available in head diameters ranging from 3/4 to 1 1/4 in. and with slot sizes of 3/16 and 1/4 inch.

Econotool Combo-Holder



**HIGHER SPEEDS!
FASTER GRINDING!**

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AIR GRINDERS

MODEL JA
50,000 R.P.M.

\$42⁰⁰
IN U.S.A.



Weight 12 ounces;
length 6 3/4 inches;
chuck size 1/4 inch.
Wheel guard removed
for better illustration;

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

kipp

MADISON-KIPP CORP.

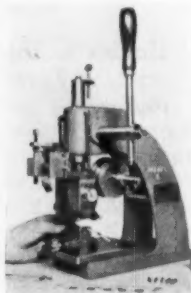
208 Waubesa St., Madison 10, Wis., U.S.A.

Improved Bench-Type Hot Stamping Machine Is Adjustable-Lever Operated

Designated as the Model E, an improved bench-type hot stamping machine which is adjustable-lever operated and which has an automatic adjustable roll leaf feed, adjustable stroke and ample working area has been announced by The Acromark Co., 9 Morrell St., Elizabeth 4, N. J. Heat is pro-

vided by a sealed tubular cartridge heating element fitted into the head, and a handy enclosed dial thermometer is mounted on the head for heat regulation. The work table is cold rolled steel mounted on a cast iron base for overhang where undercut, channel type or ring type parts are to be stamped. An opening in the back of the press permits the work to be readily passed through the machine in a left to right or backward to forward manner.

The type and die holder is provided with an interchangeable type chase for use in setting



Acromark Model E Improved Hot Stamping Machine

up any desired lettering or numbering. Names and addresses, as well as sizes, job numbers, grades and quality designations, can be readily stamped. For trademark and trade name stamping, the die holder is usually used without the type chaser.

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means a complete
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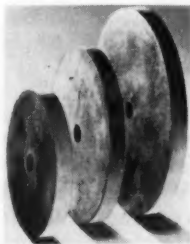
ARROW TOOL & REAMER CO.

418-422 Livernois Ave. • Detroit 9, Michigan

Rubber-Bonded Polishing Wheel Provides a Number of Degrees of Finishes

Marketed under the trade name "Sawco," a rubber-bonded polishing wheel which is designed to provide a number of degrees of finishes just by varying the pressure between the workpiece and the wheel has been introduced by Sandusky Abrasive Wheel Co., 623 W. Ransom St., Kalamazoo, Mich.

According to the manufacturer, resiliency of the bond affords maximum wheel life, with a minimum of gouging and excessive wear when the wheel is used on re-



"Sawco" Rubber-Bonded Polishing Wheels

latively rough work. The wheel can be cut to polish grooves, flutes of taps and drills, corners and other hard-to-reach areas. The wheel is available in diameters from 1 to 10 in. and with face thicknesses ranging from $\frac{1}{4}$ to 1 inch.

Motorized Gear Gaging and Sorting Machine Inspects and Sorts Gears Automatically

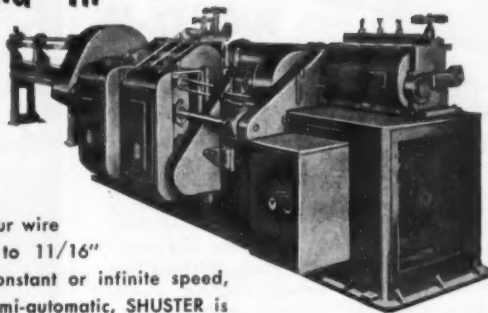
A fully automatic gear gaging and sorting machine designed for modern automated production lines has been added to the Red Ring line of gear inspection equipment by National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. The machine is said to make up to four checks on gears for both size and helix angle accuracy. When utilized to inspect spur or helical gears before shaving operations, the machine may be adapted to check size only. When

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WIRE STRAIGHTENERS
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There is a SHUSTER for any of your wire straightening needs from .025" to 11/16" diameter. Whatever the model, constant or infinite speed, dual or single control, fully or semi-automatic, SHUSTER is the "name brand" that the machines themselves keep selling.

4AV
Cap. $\frac{3}{8}$ "-11/16" Diameter

METTLER MACHINE TOOL, INC. 32 Lawrence St.

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New Haven, Conn.

NEW YORK OFFICE: Eleven Broadway, Tel.: Whitehall 4-5480



Red Ring Gear Gaging and Sorting Machine

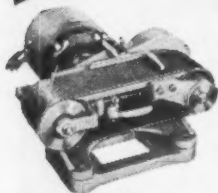
used to check helical gears following gear shaving operations, the combination size and helix angle check is made. According to the manufacturer, the machine can be installed in an automated line and can gage gears either before or after shaving in con-

junction with chutes, Syntron units or other types of feeding devices. The machine can also be magazine fed and utilized as a separate gaging device if desired.

Built-in controls are included in the machine to shut off the shaving machine after a predetermined number of reject gears are produced. Gears that meet inspection requirements are directed through a chute in the base of the machine. Undersize gears are directed to another chute, and those which are oversize and have errors in helix angle are directed through still another feed chute. Gears can be fed through the gaging machine at rates corresponding to the high speed production rates of rotary shaving machines. All auxiliary electrical components for the machine are enclosed in a separate unit which permits the gaging unit proper to be unusually compact. Signal lights on a

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DOES IT FASTER**

2



SIMPLEX-M ABRASIVE BAND GRINDER

The precision of a machine tool plus the durability of a workhorse. Complete with 1/2 H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

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MANUAL ON FINISHING—WRITE TODAY

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Sturtevant TORQUE WRENCHES

Read by Sight, Sound or Feel

- Permanently Accurate
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in inch grams
... inch ounces
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Sturtevant CO
ADDISON [QUALITY] ILLINOIS

control panel at the front of the machine indicate which of the four conditions (oversize, undersize, plus helix angle or minus helix angle) caused the gaging machine to shut down the shaving machine.

Offset Boring Head Permits Adjustments of 0.0001 In. on Diameter by Direct Reading

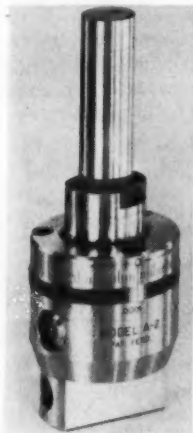
Known as the "Deka-Bore," an offset boring head that is said to be economical for both long production

runs and single-piece work) as in jig boring) has been developed by Precision Tool & Mfg. Co. of Illinois, 1305 S. Laramie Ave., Cicero 50, Ill. The head has two independent means of adjustment. The offset dove-tailed toolholder

slide is activated by the conventional micrometer screw for "roughing-in" the hole, and has a predetermined pressure factor bearing on

the gibs to eliminate backlash. The calibrations on the body of the head are the means for independent, direct and positive adjustments of 0.0001 in. on the diameter.

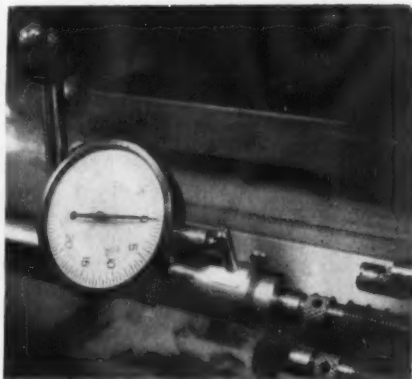
The Deka-Bore can be used on fixed or rotating applications and is adaptable to various types of production or toolroom equipment. All parts are heat treated and ground to assure years of trouble-free service. The Deka-Bore can be equipped with the user's choice of shanks on special order.



"Deka-Bore" Offset Boring Head

POSITIVE Stop Attachment

*for any turret lathe
having multiple stop roll*



Pat. Pending

• Particularly suitable to W & S, J & L and Gisholts. Be sure to specify make and model. *Guaranteed* to hold to .001 on any lateral dimension from face off to steps, grooves, etc. Eliminate human element of feel.

Saves time on set-ups and between shifts. Exceptionally accurate and fast on re-work. Chrome plated and case hardened for longer life.

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Dealer Inquiries Invited

One Thousandth Stop Co.
P. O. BOX 2217

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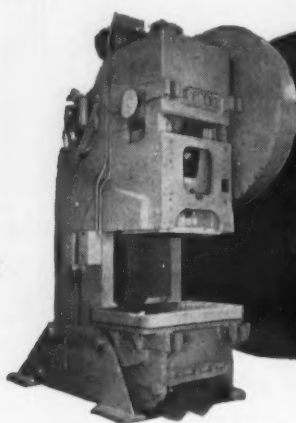
CALIFORNIA

Power Chuck Fixture Is Non-Rotating and Air Operated

The Skinner Chuck Co., 210 Edgewood Ave., New Britain, Conn., has introduced a non-rotating air operated power chuck fixture which is designed for use on drilling, milling and transfer machines and for assembly operations. The fixture is self-centering and is said to have unusual gripping power due to a wedge action. According to the manufacturer, the

angle of the operating wedge prevents the chuck from releasing the workpiece even though the air line is broken, making the unit ideal for operations on transfer machines. The unit can be disconnected from the air line and transferred to another machine for a different type of operation or different type of machining on the workpiece. The disconnecting of the air lines, it is claimed, is accomplished by means of air line couplers of the quickly detachable type.

The power chuck is available in 8, 10 or 12-in. diameter sizes, with two or three jaws. Adjustable jaws can be furnished for holding irreg-

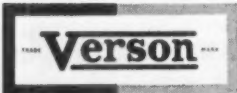


VERSION OBI's
operate with
BIG PRESS
Accuracy and
Precision

Verson O.B.I. presses combine high utility with the performance standards of big, expensive machines. They operate with accuracy and precision on a wider range of jobs than any other press. In addition, they are easily adaptable to high production set-ups.

As further proof of value, check these Verson features . . . heavy allsteel frame . . . machine cut steel gear and pinion . . . gears running in oil . . . mechanically interlocked pneumatic clutch and brake unit . . . full electric controls. Six models—capacities from 90 to 250 tons. For complete information, write today for bulletin O.B.I.-49.

A Verson Press for every job from 60 tons up.



9310 S. Kenwood Ave., Chicago 19, Ill.

VERSION ALLSTEEL
PRESS CO.

So. Lamar at Ledbetter Dr., Dallas, Tex.

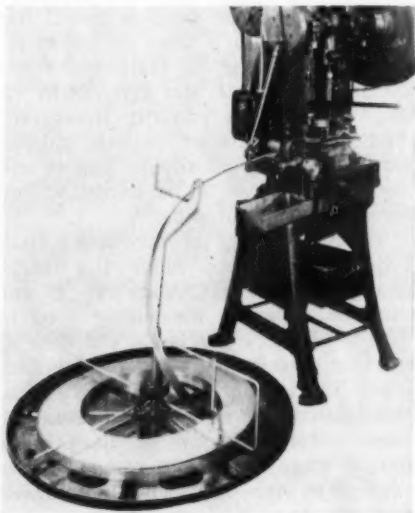


Skinner Power Chuck
Fixture

ularly shaped parts. The unit can be operated with either a Skinner hand valve, solenoid valve or a four-way foot valve. With any of these valve arrangements, $\frac{3}{8}$ -in. pipe connections are required. The unit operates on a maximum air pressure of 100 pounds.

Stock Reel Utilizes Natural Spring of Uncoiling Stock

An automatic stock reel which features a base that changes the angle of feed and allows the reel to take full advantage of the natural spring of the uncoiling stock has been announced by Jaco Devices, Inc., 98 High St., Hingham, Mass. The reel is powered entirely by the spring of the uncoiling stock, without the use of motors, belts or



Jaco Automatic Stock Reel in use

sprockets, and is fully automatic. According to the manufacturer, the loop of stock between the coil and the press feed completely eliminates slippage, kick-back and over-run. The reel supplies stock from the coil to the feed at whatever speed is established by the feed. The coil of stock lies flat on the platen, and no adjustments or settings are said to be necessary. Available with either a 24, 30 or 36-in. platen, the stock reel will operate with almost any type of coiled stock which fits the platen and weighs no more than 250 pounds.

UNIVERSAL DRILL BUSHINGS OUTLAST THEM ALL!



Superfinish bores reduce wear. Blended radius helps prevent tool hand-up and breakage. 100% concentricity and hardness tests insure accuracy and uniform high quality.

Write for complete information.

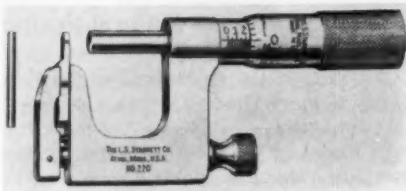
UNIVERSAL ENGINEERING CO.

FRANKENMUTH 9, MICHIGAN

180-B

Micrometer Features Interchangeable Anvils

Designated as the No. 220 "Mul-T-Anvil," a micrometer caliper which features interchangeable anvils and which permits quick, accurate measurement of tubing, cylindrical walls, from holes or slots to an edge and in hard-to-reach locations has been announced by The L. S. Starrett Co., Athol, Mass. Two anvils are furnished; namely, a rod anvil approximate-



Starrett No. 220 "Mul-T-Anvil" Micrometer Caliper

ly 0.120 in. in diameter and a flat anvil 0.125 and 0.060-in. thick at opposite ends. The rod anvil is useful for measuring from a hole to an edge. With the flat anvil, distances from the inside of slots and grooves to an edge can be conveniently measured. Additional anvils of various shapes can be made up by anyone and do not necessarily have to be hardened for occasional special jobs.

The micrometer incorporates a vise-type frame which holds the interchangeable anvils. Change-over of anvils for different measuring jobs is said to be quick and easy. The desired anvil is placed in the frame vise and, after tightening the locking screw, the micrometer is ready for use. The micrometer can also be used as a height gage by simply removing the clamping vise jaw. The instrument has a range of from 0 to 1 in. and reads in thousandths of an inch. Other features of the micrometer include no-glare satin chrome finish, hardened and ground spindle, lapped anvil



CONTINUOUS HINGES

Manufactured by

**AUTO MOULDING
& MFG. CO.**

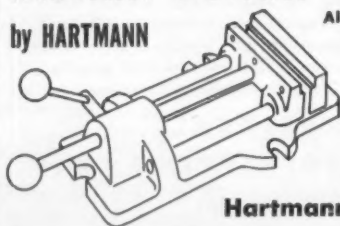
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CHICAGO 19

INSTANT ACTION

by HARTMANN

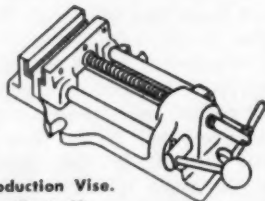


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All Purpose Tool Room And
Machine Shop Vises.

The JAWSET

Adjustable Pressure Production Vise.
For Information Write Dept. M.



Hartmann Mfg. Co., 1637 Goold St., Racine, Wis.

and spindle faces, quick-reading graduations and convenient decimal equivalents on the frame.

Flexible Grinding Wheels Are Available in Multiple Wheel Units

Merit Products, Inc., 4023 Irving Place, Culver City, Calif., has announced that its Grind-O-Flex Flexible Grinding Wheels are now available in multiple wheel units. Three or more wheels may be mounted together to form a single broad wheel, acting on a much larger area than one wheel alone and yet losing none of the flexing action found in the individual wheel. According to the manufacturer, any number of the units can be assembled together as required in increments of 1 in. for fixed installations. When attached to a flexible shaft or portable drill, three to five wheels are recommended for best results. The



Grind-O-Flex Multiple Wheel Unit in use

wheels are said to be useful in finishing metals, deburring, flash removal and removing scratches, marks, tool marks and other blemishes. Because of the wheel's ability to flex, it follows irregular contours and provides a smooth, uniform abrasive action without digging into the material.

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Balancer Suspends All Types of Portable Tools

Identified as the Model 7472, a balancer for suspending all types of portable tools (air or electric), gages and fixtures weighing up to 5 lb. has been announced by Aro Equipment Corp., Bryan, Ohio. The unit is small in size, weighing 2 lb., and is designed so that all adjustments are on the outside. In-line suspension prevents twisting or turning when the cable

is pulled out. The cable is sheathed with tough, wear-resisting nylon. The housing is made of strong, lightweight metal with a flat profile. Simple adjustment for spring tension can be made, after the tool and the balancer have been mounted, by pressing the spring lever to relieve tension, or by tightening a nut on the opposite side to increase tension. The cable stop is adjustable for regulating length of travel.



Aro Model 7472
Balancer

Cable replacement requires the disassembly of housing halves only, by removing three screws. The unit is furnished with five working feet of steel cable, nylon sheathed.

NON-ROTATING DRILL STOP for Precision Hole Depth Control



Now you can be certain of positive control of hole depth with the WOHLNIP Precision Drill Stop . . . which is Non-Rotating. Will not mar, mark or damage the face of the work, fixture or bushing. Completely automatic, the WOHLNIP Drill Stop reduces human errors, simplifies difficult jobs, lowers machining cost, increases production and accuracy, eliminating rejects. Used for drilling, center drilling, countersinking, boring, milling, routing, reaming. Used on drill presses, radial drills, milling machines, lathes, turret lathes, hand and automatic screw machines. Available as shown and with standard straight and taper shanks for any size needed.



(Patent Pending)

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Automatic Finishing Machine Features 62-Inch Indexing Turret

Identified as the Model K-62-7, a rotary automatic indexing, polishing and buffing machine which is designed to accommodate up to six head stand units and which features an indexing turret that measures 62 in. o.d. x 42 in. high from the floor to the top

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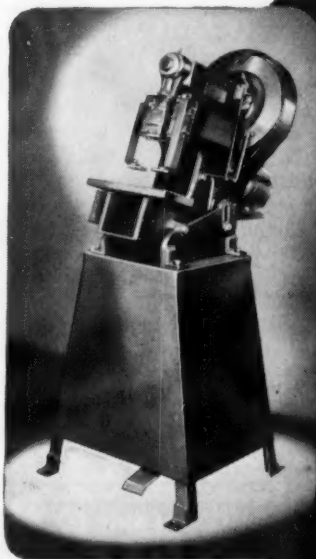
of the spindles has been announced by Hammond Machinery Builders Inc., 1615 Douglas Ave., Kalamazoo, Mich. The machine operates on a constant high speed index movement of one second, has an adjustable dwell period and has an operating range of from 150 to 1,700 indexes per hour. The table is locked in each indexed position by a tapered lock bolt that engages the table. The lock bolt is pulled from the table prior to indexing by a cam on a Geneva lever shaft.

Table work spindles are driven by a $\frac{3}{4}$ -h.p. motor at variable speeds of from 15 to 45 r.p.m. or from 50 to 150 r.p.m. The spindles operate entirely independent of the indexing operation on the machine. The table is equipped with seven work spindles, six of which support and rotate the work at the wheel station and the seventh is at the operator's station in front of the machine for loading and unloading. To assist the operator, the spindle at



Hammond Model K-62-7 Rotary Automatic Indexing Polishing and Buffing Machine

the operator's station does not revolve, but is stopped and held by a spring tensioned brake. This brake also serves to start rotation of the spindle as it is indexed into the moving table chain, thereby reducing wear.



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Small, powerful inclinable punch press that can be tilted to a maximum of 25°. Fly-wheel at rear permits easier feeding of stock; also provides greater margin of safety. Rated at 275 strokes per minute; length of stroke is 1"; capacity 5 tons. Has non-repeat clutch.

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Floor Space — 29" x 22"

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WHITNEY METAL TOOL COMPANY
110 FORBES STREET, ROCKFORD, ILL.

Shaft Mounted Speed Reducer Has Double-Enveloping Worm Gearing

A shaft mounted speed reducer with double-enveloping worm gearing has been announced by Cone-Drive Gears, Division of Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. According to the manufacturer, the right angle between the input and output shafts offers many application and

space-saving advantages. The reducer is mounted directly on the driven shaft and requires only a simple bracket or torque arm to prevent it from rotating about the driven shaft. Where a motorized reducer is desired, a bell housing can be furnished to accommodate standard N.E.M. A. C-type flanged motors. A tang-type drive sleeve and suitably machined worms are provided with the bell housing to match the motor shaft being used. When a shaft mounted speed reducer and flange mounted motor are used, no bed plate or mounting arrangement is required.



Michigan Cone-Drive Shaft Mounted Speed Reducer

The right angle reducer is available in three sizes—2, 2½ and 3-in. center distance—and can be furnished in pinion under, pinion over or vertical shaft models. Reduction ratios for the 2 and 2½-in. center distance reducers are from 5:1 to 50:1; for the 3-in. model, the ratios range from 5:1 to 60:1. When the motor is connected to the input shaft by means of V-belts and sheaves, additional output speed reduction can be secured. Bore sizes for the 2-in. unit range from 1 through 1½ in. in ¼-in. steps; the 2½-in. reducer

in. in 1/8-in. steps; the 2½-in. reducer



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bore sizes range from 1 through 2 in. in steps of $\frac{1}{16}$ -in.; and the 3-in. reducer can be supplied with bores ranging from $1\frac{1}{16}$ through $2\frac{1}{2}$ in. in steps of $\frac{1}{16}$ inch. All bores in the 2-in. unit are machined to size without bushings. The bores in the $2\frac{1}{2}$ -in. unit are bushed from 1 through $1\frac{1}{8}$ in. and without bushings from $1\frac{7}{16}$ through 2 inches. The bores in the 3-in. unit are bushed from $1\frac{3}{16}$ through $1\frac{1}{2}$ in. and without bushings from $1\frac{1}{2}$ through $2\frac{1}{2}$ inches. Loads that can be handled by the three sizes of reducers range from fractional horsepower to 3, $5\frac{1}{2}$ and 9 h.p., respectively.

Vertical Mill Provides Eight Quickly Changeable Speeds

Masters Machinery Supply Co., 3613 Archer Ave., Chicago 9, Ill., has announced a vertical mill for production and toolroom milling. The mill has a swivel-type head, permitting a

full turn of 90 degrees, and a 12-in. clearance below the spindle. The machine features a direct gear drive assembly, coupled with a 2-speed, 1 h.p. motor. Eight quickly changeable speeds ranging from 125 to 1540 r.p.m. are available.

The ball and roller bearing mounted spindle of the machine has a handwheel feed with a $4\frac{1}{2}$ -in. travel and a quick return. The heavily constructed feed table has a 11-in. longitudinal travel and a $6\frac{1}{2}$ -in. cross-feed travel. The heavy casting base is designed with a cut-away front so that the operator can be close to his work.



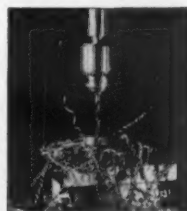
Masters Vertical Mill

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DRILL THEM *FASTER,*
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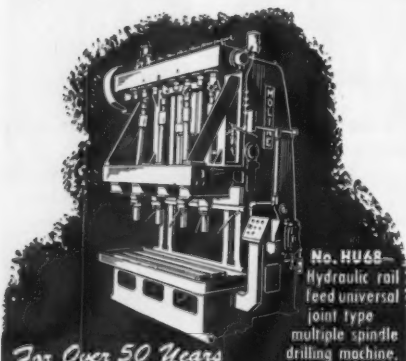
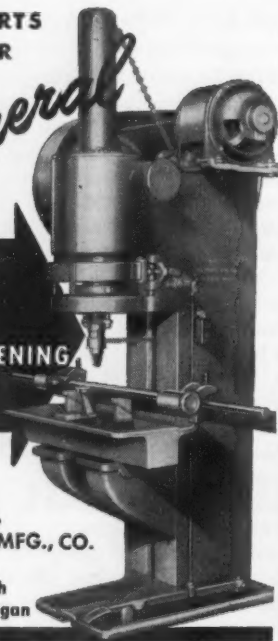
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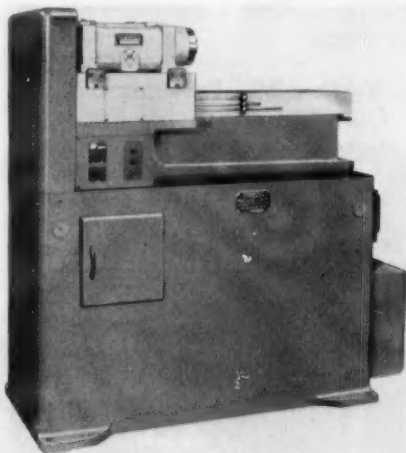
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costs for American
Industry.

No. HU68
Hydraulic rail
feed universal
joint type
multiple spindle
drilling machine.

Boring Machine Provides Completely Automatic Operating Cycle

The Simplex 2BA Mechanical Automatic Feed Precision Boring Machine illustrated herewith, product of Simplex Machine Tool Corp., 4536 W. Mitchell St., Milwaukee, Wis., is recommended for any shop where precision boring of small or medium jobs is a factor.

The machine's automatic feed unit provides a completely automatic cy-



Simplex 2BA Mechanical Automatic Feed Precision Boring Machine

cle which consists of rapid traverse, feed, dwell and rapid return. After the start button is initially pressed, the above-mentioned cycle is accomplished by means of limit switches.

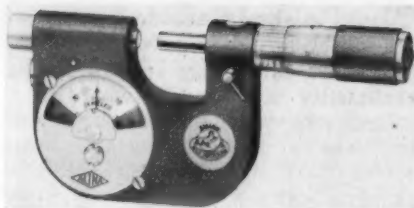
The total length of feed and length of rapid traverse are adjustable by means of trip dogs. At any time during the cycle, the stop button can be pressed to stop the machine, and an emergency return is also provided to allow the table to be returned at any time during the cycle. The feed changes are accomplished through feed change gears, and feeds from

1½ to 13½ in. per minute can be obtained. A reversing feed is available on special order.

Precision Dial Micrometer Has Jeweled Indicator Movement

Identified as the Etalon 25N, a micrometer that combines the precision of a dial indicator with the accuracy of a micrometer screw has been placed on the market by Alina Corp., 401 Broadway, New York 13, N. Y. A retractable anvil permits quick and easy introduction of the part to be checked without danger of scratching. The load on the retracting mechanism is adjustable, and the retracting mechanism, it is claimed, can in no way influence the reading. The entire unit may be used in the hand or mounted in a micrometer stand.

The dial of the Etalon 25N can be adjusted as much as three graduations, thus greatly simplifying fine



Etalon 25N Precision Dial Micrometer

adjustment of the instrument. Both the dial and the barrel of the micrometer are graduated in 0.0001 inch. The dial permits a reading of 0.002 in. on either side of the zero position. For added convenience, the built-in tolerance hands are of different colors—blue for undersize and red for oversize—and may be individually adjusted to any position on the dial. The jeweled indicator movement of the Etalon 25N is said to be shock-proof, durable and accurate.

Save Time . . . Labor . . . Materials with



Inside SLOTTER

Make cuts up to 8" inside edge of sheet. Sharp, clean burr-free cuts always assured. Cap. 16 ga. High strength aluminum alloy body; H.C.H.C. blades.



Throatless SHEAR

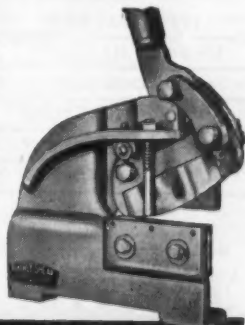
Make any cut—straight, irregular, curved. Exclusive design permits turning work any direction while cutting. 4 models—cap. to 3/16".

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New "55" Series—easier cutting with compounded linkage. 3 models—cap. to 3/16"; trimming capacity to 5/16" mild.

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Semi-Finished Carbide Reamers

Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich., has announced the availability of carbide reamers in a complete size range in rough ground, semi-finished stage. The semi-finished reamers are supplied with adequate grinding stock so that, for example, a 1/2-in. nominal size may be ground 0.490 in. to 0.516 in. and a 1-in. nominal size may be ground 0.990 in. to 1.000 inches.

Face Mill Is Designed for Heavy Cuts

A face mill cutter which is designed for extra heavy steel and cast iron roughing operations where large amounts of stock must be removed in one operation has been announced by Wesson Co., 1220 Woodward Heights Blvd., Ferndale (Detroit 20), Mich. For maximum rigidity and strength, the extra-thick cutter body is a 6145 steel forging with thicknesses from

3 1/4 to 3 3/4 inches. Special 1 1/2-in. high replaceable Wessonmetal carbide-tipped blades, capable of 7/8-in.

YESTERDAY'S PIONEER . . . TODAY'S LEADER

IF

you think
End Mills are
all alike



WELDON DOUBLE-END END MILLS offer definite superiorities

LESS BREAKAGE
UNIFORM HARDNESS
UNIFORM SIZE
UNIFORM FLUTE TURN
UNIFORM CLEARANCE
TRUE RUNNING
CLEAN CUTS

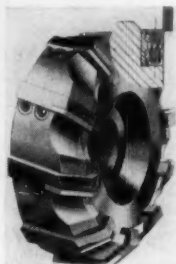
YES, Weldon Double-End End Mills have all these advantages. In addition they give you double the service for less than the cost of two single-end end mills of equal size. They save production time too, because when you want to change the mill you need only turn it end for end.

Weldon Distributors throughout U.S.A. and Canada carry complete stocks to serve you.

THE WELDON TOOL COMPANY



3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO



Wesson Face Milling
Cutter

cut, are positively locked with Wesson Dual Wedg Locks. Combined with deep blade serrations, the Dual Wedg Locks are said to enable rapid and accurate blade set up.

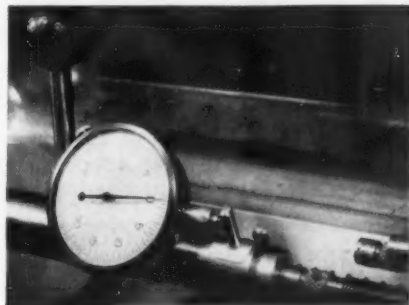
The lock is a small compact unit with two moving wedges that lock against the blade. The wedges, actuated

by a few turns of a lead screw, are self-adjusting both axially and radially even if the blade is tapered, stepped or out of square. Large, deep chip gullets are provided in the cutter body for smooth and rapid chip removal.

Turret Lathe Stop Attachment Holds 0.001 Inch on Any Lateral Dimension

A stop attachment for turret lathes which is said to hold to 0.001 in. on any lateral dimension from face off to steps, grooves, and so on, has been announced by One Thousandth Stop Co., P.O. Box 2217, Van Nuys, Calif. Made of case-hardened steel, chrome plated for longer life, the stop is 4½ in. long. Spring loaded, it tends to kick off power and hand feed into readable dimensions. According to the manufacturer, the stop can be easily

attached to the master stop of Warner & Swasey, Jones & Lamson and any other turret lathe having multi-



One Thousandth Stop Attachment

ple stop roll. The stop, it is claimed, will repeat consistently on the mean, and best results are obtained from a 0.0001-in. indicator (½-in. travel).

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WHITNEY
AIRCRAFT

*the
MAGNI-
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helps
insure
accurate
inspection
of a
precision
part for an
aircraft
engine.*



MAGNI-FOCUSER's matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

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Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

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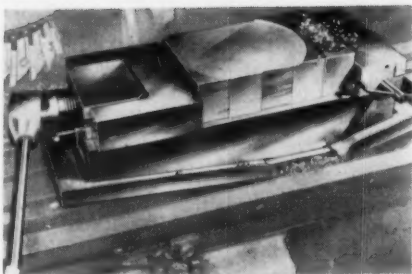
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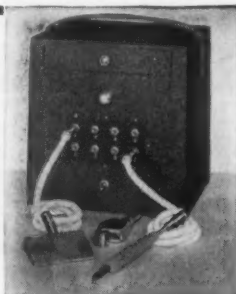
Milling Machine Vise Is Low, Light and Roomy

Made of cast steel, hardened and ground, a swivel milling machine vise, without a pedestal, which is low, light and roomy and which rests solidly on the machine table has been announced by J & S Tool Co., Inc., 645 W. Mt. Pleasant Ave., Livingston, N. J. The vise opens to a distance of 12 inches. A trigger stop enables an operator to open and close the vise to a desired po-



J & S Milling Machine Vise

**MARK
IRON,
STEEL
and
CARBIDES**



**THE
Etchograph
WAY**

Original Electric Etcher, Thousands in Dolly Use
Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements.

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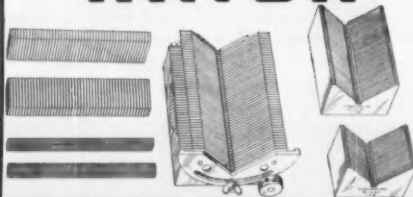
P. O. Box 191

Tenafly, N. J.

sition quickly and easily. No turning of the handle is required in this operation; it is necessary only to lift the trigger stop and either push or pull the movable jaw of the vise into position. A detachable knuckle handle, 18 in. long, permits selective tightening positions of the handle every 30 degrees. The extra length of the handle provides ample leverage. A feature of the vise is a unique downholding clamping action. The jaw of the vise travels straight in and down and locks the workpiece horizontally against the opposite jaw and downward against the table, thus assuring accurate, dependable positioning.

The vise has a dual-purpose fixed jaw and a movable, adjustable jaw. The solid jaw of the dual-purpose fixed jaw has two attachable vees with which to hold round work in a vertical position; the other side of the jaw has a downholding clamping action. The 3½-in.

ANTON



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- MAGNETIC V-BLOCKS
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- MAGNETIC ADJUSTABLE V-BLOCKS
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1226 FLUSHING AVENUE • BROOKLYN 37, N. Y.

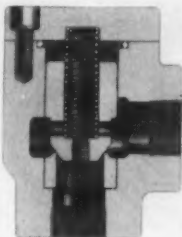
depth of the jaw permits the use of an adjustable angle bar for angular positioning. The movable jaw of the vise is adjustable to a fixed or floating position. It can be made to favor a corner of the workpiece or float out of parallel with the workpiece. Self-cleaning, snap-on parallels enable workpieces to be loaded and unloaded quickly and easily, and an adjustable stop provides true positioning for repeat operations. An opening at the rear of the vise allows chips to escape.

Valve Allows Free Flow in One Direction and Prevents Flow in Opposite Direction

A 3,000-p.s.i. hydraulic check valve which is designed to allow free flow in one direction and prevent flow in the opposite direction has been introduced by Rivett Lathe & Grinder,

Inc., Dept. MM, Brighton 35, Boston, Massachusetts.

According to the manufacturer, the valve features a large area which permits unusually large volume; for example, the 1½-in. size valve has a 104.2 g.p.m. capacity at 15 ft. per second. The valve can be supplied with pipe thread or flange connection, spring closed or pilot operated and in sizes ranging from ¼ to 1½ inches. Mounting may be made in any position. The Model 8640 is spring closed, the Model 8642 is pilot operated and the Model 8644 is pilot operated with a pressure breaker.



Rivett Model 8640 Hydraulic Check Valve

NEW

ACCURATE

AUTOMATIC

Morrison

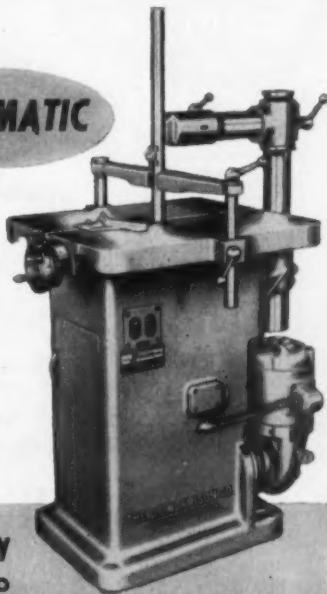
1" KEYSEATER

- ★ AUTOMATIC FEED eliminates pushing a feed bar and insures accuracy.
- ★ AUTOMATIC STOP cuts off the feed for any given depth.
- ★ AUTOMATIC RELIEF backs the work away from the cutter eliminating drag and insuring a clean keyseat.
- ★ AUTOMATIC CENTERING centers up the work quickly and easily.
- ★ AUTOMATIC LUBRICATION feeds oil to all necessary moving parts.
- ★ SINGLE TOOTH CUTTERS for accurate clean keyseats and eliminating time and trouble in sharpening.
- ★ QUICK SET UP is one of the most important features.

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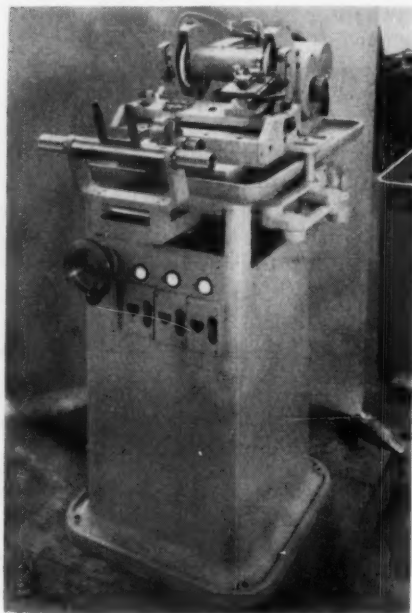
SAWING



GROB
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Machine Reproduces Accurate Form Grinding from Master Stylus

Designated as the "Copyrex," a copy grinding machine which is said to reproduce accurate form grinding from a master stylus or template through a pantograph and which produces two tools in the same motion is now being marketed by High Pre-



"Copyrex" Copy Grinding Machine

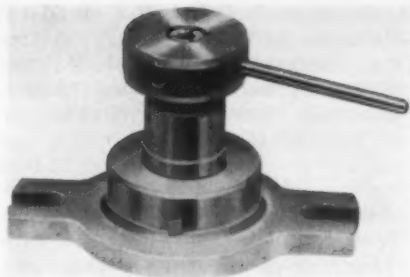
cision Products Co., Westfield, N. J. The machine incorporates three fingers or master stylii for roughing, semi-finishing and precision finishing. The grinding of the desired shape is effected in the copying process from a template enlarged to five times full size. During the grinding, the template is guided along a stationary copying finger. These movements are transmitted with a reduction of 5 to 1 through a parallelogram linkage to

the toolholder on which the workpieces to be ground are clamped.

The copying finger holder is arranged for accommodating three fingers simultaneously, any one of which can be brought into contact with the template. The fingers are graded in shape and are interchangeable. For grinding circular lathe tools, form rollers, cylindrical production parts, and so on, a cylindrical grinding attachment is supplied which is mounted on the tilting plate and which is driven by a separate electric motor through reduction gear. The maximum diameter of the ground piece is 4 inches.

Collet Fixture Is Designed for Use in Secondary Operations

Smith Sales Co., 193-16 99th Ave., Hollis, N. Y., has announced a collet fixture, precision made to fit many existing standard collets from $\frac{1}{16}$ to



Smith Collet Fixture

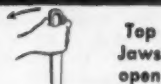
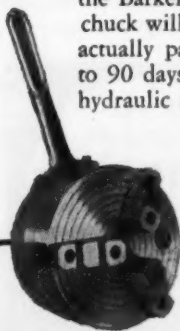
1 in. in diameter, which is designed for use in secondary operations of drilling, tapping, counterboring, milling, slotting and reaming. The collet fixture is simply mounted by bolting to the face plate of a lathe, the table of a drill press or the bed of a milling machine. Collet accuracy is said to be attained for hexagon and square parts, as well as rounds. According

Labor Saving Production CHUCK

Will pay for itself in 60 to 90 days

On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days. Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.

Write for bulletin 201 today.



Top Jaws open



Hand lever closes and locks while lathe is running.

Jaws locked

CHUCK DIVISION
THOMAS HOIST CO.
28 S. HOYNE CHICAGO 12, ILL.

to the manufacturer, the standard fixture is particularly adapted for gang milling with several fixtures mounted in line. Both standard and right angle models are available.

Automatic Sizing Mandrel Embodies Advantages of Air Gaging

Identified as the "Pioneer," an automatic sizing mandrel which is a

**RAPID
SET-UPS** : with extreme accuracy—every
: time and on the first try!



In Essence:
A Floating,
Precision Vise

Brookfield
TOOL HOLDER

One Brookfield Tool
Holder = One Con-
ventional Tool Holder
+ Stock of at least
100 Bushings.

- Adjustable V Jaw
- Axially True Design
- Balanced-Pressure Locking

No more fussing with bushings . . . just slip tool in jaw and tighten . . . run-out is less than .0001 per inch . . . Brookfield Tool Holders guarantee clean, easy, solid set-ups every time and on the first try! Models available for nearly all automatic and hand screw machines, turret lathes, radial drills, etc. Also useful as Adjustable Steady Rest and Work-Holder.

Write Dept. M for descriptive brochure.

BROOKFIELD, INC. 240 Cushing St.
Stoughton, Mass.



National "Pioneer" Automatic Sizing Mandrel

pneumatic honing and measuring device embodying the advantages of air gaging has been announced by National Pioneer, Inc., 1134 Nebraska Ave., Toledo 7, Ohio. Designed for use on all Sunnen models and other makes of horizontal honing machines, the mandrel, it is claimed, can be used either for manual honing applications or in combination with an automatic stroking attachment to provide a completely automatic honing and sizing unit. According to the manufacturer, the unit is accurate on a production basis to plus or minus 0.0001 inch. The mandrel is said to provide direct gaging of the part while it is being honed and positive control of taper and bell-mouth conditions.

ON OILY AND
GREASY FLOORS

STOP

COSTLY SLIPPING
ACCIDENTS

USE Tamms
FULLER'S EARTH

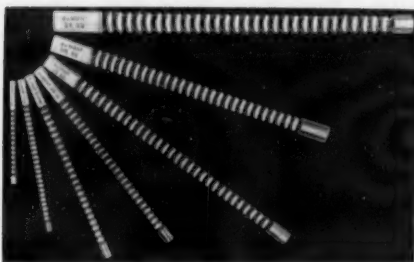
Adds greatly to the safety of your shop • Provides safe non-slip footing • Absorbs oil and grease • Lessens fire hazard because, unlike saw dust or wood shavings, it is non-inflammable • Every shop needs this low cost safety aid.
A trial will convince you. Send for **FREE SAMPLE**.

DEPT. RM-9

TAMMS INDUSTRIES, INC. 228 N. LA SALLE ST., CHICAGO 1, ILL.

Broaches Are Designed for Use on Square Holes

The du Mont Corp., Greenfield, Mass., has announced a line of "Minute Man" high speed steel, push-type



du Mont "Minute Man" Square Broaches

square broaches which are designed for operation on square holes. The broaches are available from stock in eight standard sizes ranging from $\frac{1}{16}$ to $\frac{3}{4}$ in. square, precision manu-

factured to close tolerances. Starting with a round pilot, the broaches are claimed to be capable of finishing a square hole in a drilled, reamed or cast bore in one pass, in less than one minute. The broaches can be used in either a hand operated arbor press or a hydraulic press. Square broaches in non-standard sizes and other special rectangular and hexagonal shapes can also be supplied.

Ram-Type Milling Machine Affords 22-Inch Longitudinal Travel

Fray Machine Tool Co., 2935 N. Ontario St., Burbank, Calif., has announced a medium-size ram-type milling machine, designated as the Model 1 $\frac{1}{2}$ V, which is available in two table sizes; namely, a 9 x 36 in. table with a 22-in. longitudinal travel and a 9 x 42 in. table with a 28-in. longitudinal travel. According to the manufactur-

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Conant offers complete engineering and manufacturing facilities for your broaching needs. Expertly designed for proper strength and chip carrying capacity. Prompt broach sharpening and reconditioning service. Order standard keyway broaches from our stock.

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347 W. 107th St., Chicago 28, Ill.

TOOL ENGINEERS and TOOL MAKERS

HERE IS A NEW TOOL TO STUDY. HIGHEST STANDARD OF EFFICIENCY AND ACCURACY UNRIVALLED IN PRICE AND VALUE

It's the NEW

MICRO LOCK

QUICK CAMLOCK

+ MICRO FINE ADJUSTMENT COMBINED

made by the FAMOUS

MAUSER

SPECIFICATIONS

Total Length: 9" - Measuring Capacity: 6" - Graduations: 1/1000" & 1/128" - Code Word: GINHO

Without detachable Base and Scriber — **\$25.00**

Same as above but with detachable Base and Scriber — **\$33.00** or - Code GINPU

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Send for Folder - Code GINRE

GEORGE SCHERR CO., Inc.

COMPLETE LINE OF PRECISION INSTRUMENTS

200 MM LAFAYETTE ST. • N.Y. 12, N.Y.

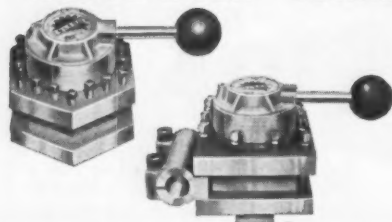
GRANT RIVETERS



• Pioneers in the riveting field. Head rivets from smallest to $\frac{3}{4}$ " diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 5, Conn.

"WEDGE-LOCK" TURRET



Does not raise up when indexing in all 12 positions. 4-way and 6-way block models. Repetitive accuracy to within .0003 plus or minus within itself.

WRITE FOR FOLDER

Makers of Combination Rotary Tables and Angle Plates. Also Helical Gear Speed Reducers, Single and Double Reduction. Also Special Gears of All Types.

Open territory available to representatives.

OLSON INDUSTRIAL PRODUCTS, INC.

40 W. WATER ST. • WAKEFIELD, MASS.

er, the machine is designed to take full advantage of high speed steel cutters, while offering the rigidity and speeds necessary for use with carbide cutters. The mill is equipped with a Type 4 precision milling head and a heavy-duty quill-type attachment which permits the operator to work to close tolerances. The quill has a $3\frac{1}{2}$ in. travel, and its weight is adjustably compensated for sen-



Fray Model $1\frac{1}{2}$ V Ram-Type Milling Machine in use

sitivity. The standard head is equipped with a $\frac{3}{4}$ -h.p. motor. The milling head is provided with both lever and handwheel feed in a wide range of speeds. The standard head is furnished without back gear arrangement.

The heavy-duty dovetail ram assembly on the machine has a $12\frac{1}{2}$ -in. standard ram travel or a $20\frac{1}{2}$ -in. optional ram travel. Of unusually heavy construction for top capacity, the ram assembly is equipped with a rack and pinion for positioning and

a locking mechanism which is said to assure positive clamping. A built-in worm adapted on the ram positions the head at the desired angle.

Abrasive Saw Blade Has Universal Bushing

An abrasive saw blade with special universal bushing which enables the blade to be used on most popular makes of portable tools, bench and stand grinders, and on flexible shafts with guards has been introduced by Chicago Wheel & Mfg. Co., Dept. MMS, 1101 W. Monroe St., Chicago 7, Ill. Designated as the "Handee," the blade is available in two sizes, 7 and 8 in. in diameter, and in two types—masonry and general purpose.

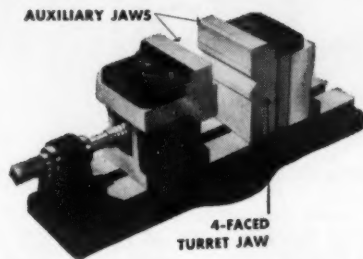
Handee Saw Blades are offered to dealers in a colorful self-service display—a dozen blades to a carton. Three 7-in. general purpose, three 7-in. masonry, three 8-in. general pur-



"Handee" Abrasive Saw Blades with universal bushings in 12-blade display carton

pose and three 8-in. masonry blades come in the display carton that contains instructions and selling information for the dealer. Each Handee Blade is individually packaged.

SAVE SET-UP TIME



Brown Turret-Jaw Utility Vises cut production costs by eliminating time wasted on "rigging" set ups. It improves work quality because of rugged construction and ability to hold work tightly.

For complete specifications and prices write for Bulletin 23M, Brown Engineering Co., 120 N. 3rd Street, Reading, Pa.

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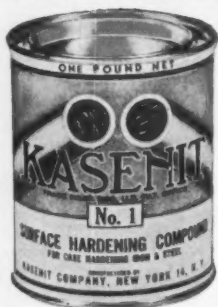
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TOOLS
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Non-Explosive
Non-Inflammable**

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Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

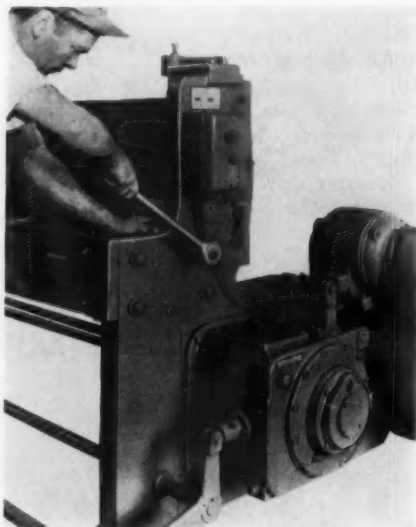
Write for Folder

CARROLL DIVIDING HEAD CO.

3525 Cardiff Ave. • Cincinnati, Ohio

Redesigned Drive Unit Available for All Wysong Power Squaring Shears

A completely redesigned drive unit for all Wysong power squaring shears has been announced by Wysong & Miles Co., Greensboro, N. C. The drive unit is fully enclosed and runs in oil, and the new design eliminates a long pinion shaft. Because the gears run in oil, gear wear is greatly reduced. Another improved feature is the plac-



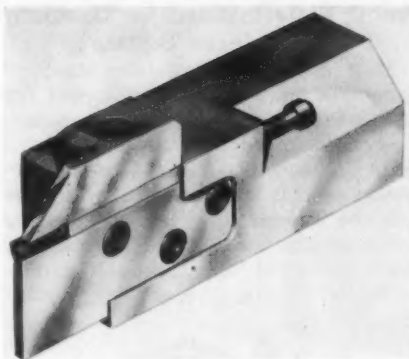
Wysong Power Squaring Shear equipped with redesigned drive unit

ing of the bed-belts on the outside of the end frames, making the bed-belts easily accessible and blade setting easier. A simplified non-repeat unit is standard on Wysong power squaring shears. By pulling out a hand knob located on the drive unit, the shear is set for positive single stroke shearing. Other standard features of the shear includes a nine-jaw clutch; precision back gage; automatic hold-down with spring activated compensating plunger in each foot; self-

energizing brake; and a metal finger guard that does not obstruct a clear view of the cutting edge.

Cut-Off Tool Features V-Blade Support

The Portage Double Quick Tool Co., 1041 Sweitzer Ave., Akron 11, Ohio, has announced the Manchester Cut-Off Tool which features a V-blade support, assuring accurate location of the carbide cutting insert. According to the manufacturer, the cutting insert is always on center and will not "lead-off" during cutting operations. Claimed to provide long tool life under heavy feeds and fast s.f.p.m., the tool features an unusually fast 15-second insert change. The tool body does not need to be removed from the setup to replace a dull cutting insert. An adjustable stop provides positive backing to prevent the insert from sliding back and also affords a meth-



Manchester Cut-Off Tool

od of adjustment after the insert is reground.

Interchangeable blade inserts are of molded carbide, butt welded to the steel shank. The tool is available for use on all turret lathes, automatics, cut-off machines and engine lathes.



- Adjustable Vee Block Grip
- Full Length Tool Contact
- Powerful Clamping Force
- No Harmonic Vibration
- No Chatter
- Grips Round, Square, Rectangular and Cut-Off Tool Bits
- One Holder Handles Many Bit Sizes
- Carbide Models Also Accommodate Boring Bars
- Tilted Head Improves Vision

SPECIFICATIONS

Specify Right or Left Hand Offset

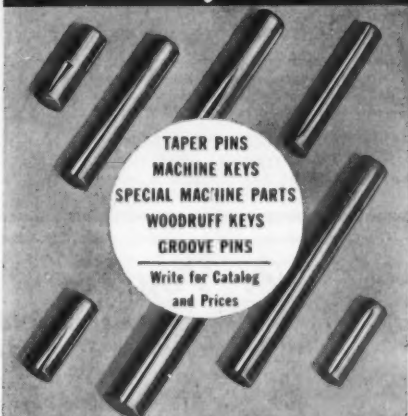
FOR CARBIDES (No Rake)	Model P60	P61	P62	P64
FOR HIGH SPEED STEEL (15° Rake)	Model 60	61	62	64
SIZE:	0	1	2	4
TOOL CAPACITY	1/8" to 5/16"	3/16" to 3/8"	1/4" to 1/2"	5/16" to 5/8"

Order from your dealer—Ask for Clark!

ROBERT H. CLARK COMPANY

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"Get them from Gillen"



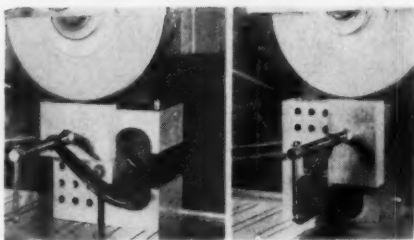
TAPER PINS
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Write for Catalog
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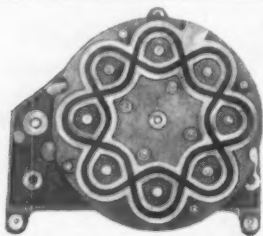
John Gillen Company
INC.
2542 SOUTH 50th AVENUE • CICERO 50, ILLINOIS

Angle Plate Is Used for Grinding Workpieces Square

Designated as the "Square Master," an angle plate which is designed for use in grinding workpieces square has been announced by Federal Machine Tool Co., Bristol, Conn. With the precision tool, it is claimed, a workpiece can be ground to exact squareness without the use of such auxiliary tools as an indicator, precision square or surface plate. The unit has a built-



Federal "Square Master" Angle Plate in use



Rowbottom-produced braiding machine cam



Any quantity . . . quickly

Our half-century's highly specialized experience is assurance your needs will be promptly met . . . at worthwhile savings. Accuracy guaranteed. Submit samples or drawings for estimates.

THE ROWBOTTOM MACHINE CO.
WATERBURY, CONNECTICUT

Also Cam Milling and Grinding Machines for producing cams of all types. Ask for details.

in recess into which a C-clamp can fit while one side of the workpiece is being ground. The angle plate can then be turned over on its side to grind the other side of the workpiece. Neither the C-clamp nor the workpiece has to be removed. According to the manufacturer, the unit can also be used for layout and inspection work, since all working surfaces are within a 0.0002-in. squareness.

Metal-Cutting Band Saw Features Two Blade Speeds

Atlas Press Co., 2446 N. Pitcher St., Kalamazoo, Mich., has announced a 12-in. metal-cutting band saw which features two blade speeds of 100 and 250 f.p.m. and which is designed for trimming and contour sawing a wide range of metals from iron and steel, including stainless and high carbon, to brass and copper. According to the

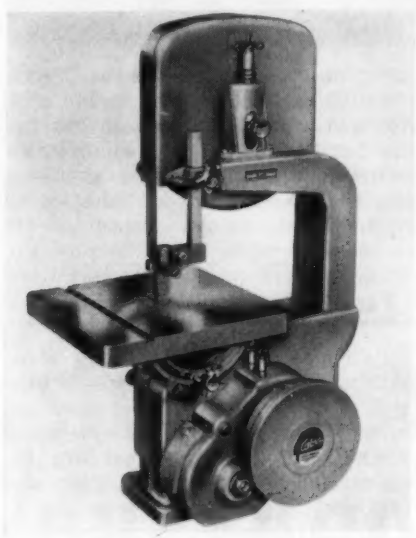
For Your Convenience . . .

the "Where to Get It" section of MODERN MACHINE SHOP provides a quick reference to machinery, tools and supplies advertised in the current issue. Use it consistently. You'll find it's very helpful. (See pages 336, 338, 340 and 342.)

MODERN MACHINE SHOP
431 MAIN STREET • CINCINNATI 2, OHIO

manufacturer, the saw is capable of cutting to the center of a 24-in. circle and has a 6¼-in. capacity above the 14 x 14-in. tilting table. The heavy-duty speed reducer is driven by a V-belt from the motor, and power is transferred to the saw through two sets of hardened sprocket wheels and roller chains. Ground sprocket wheel shafts turn on sealed-for-life ball bearings.

The saw base and arm are heavy



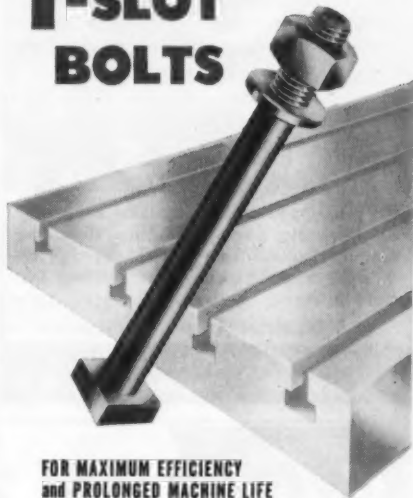
Atlas 12-Inch Metal-Cutting Band Saw

iron castings which minimize vibration. The grey-iron table is supported by two widely spaced trunnions. Saw wheels are carefully balanced, and each turns on two sealed-for-life ball bearings. Easily portable, the machine measures 14 x 22¼ x 35⅞ in. high, less the motor and the stand. Other features include floating motor rail for quick speed changes, easily adjustable blade guides and ball bearing blade support wheels and conveniently located controls.

August, 1954

BOYAR-SCHULTZ

Precision-made
ALLOY STEEL
T-SLOT
BOLTS



**FOR MAXIMUM EFFICIENCY
and PROLONGED MACHINE LIFE**

It does not take long to ruin the accuracy of costly machine tools when poorly made, soft steel bolts of ordinary manufacture are used.

Boyar-Schultz T-SLOT Bolts are precision made with heads at right angle to bodies, carefully machined to present a broad, flat surface to the upper surface of the T-slots. They are made from alloy steel forgings, heat treated for maximum properties and are tough and hard. Threads, class 3 fit will not easily strip or distort. Special Nuts and Washers are specially made to give best results with Boyar-Schultz T-SLOT Bolts.

When compared with refinishing and truing the bed of a machine tool, the cost of GOOD bolts is trifling. Write for Free Catalog.

BOYAR-SCHULTZ CORPORATION

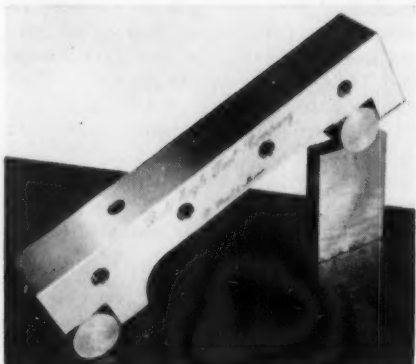
2020 S. 25TH AVE., DEPT. D-B
BROADVIEW (CHICAGO), ILL.

MODERN MACHINE SHOP

319

Sine Bar Measures Angles Accurately to Seconds

A 5-in. sine bar which is said to measure angles accurately to seconds has been announced by Bald Eagle Tool Co., 357 Minnesota St., St. Paul 1, Minn. According to the manufacturer, the rolls are held to the same diameter within 0.0001 in. and the surface of the bar is parallel to the rolls within 0.0002 in. in 5 inches. The entire tool is precision finished, the



Bald Eagle 5-Inch Sine Bar

roll seats are hand scraped and the sine bar body is double normalized to assure maximum accuracy and long life. Convenient tapped holes, it is claimed, make setups easy.

CAMS

Fully equipped modern machine shop with extensive **Jig Boring**, **Surface Grinding** and **Horizontal Boring** facilities as well as modern **Rowbottom Cam Milling** and **Cam Grinding** equipment.

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Small TAPER PINS

Diameter up to .125" — Length up to 1"

Hardened and Ground

Taper Tolerance .0001" In Length Of Pin

Diameter Tolerance .0005"

Send Specifications for Quotations

**COMMERCIAL
CENTERLESS
GRINDING CO.**

8805 CEDAR AVE. Phone EN 1-3412 CLEVELAND 3, O.

Face Milling Cutters and Shell End Mills

Two series, Fine and Extra Fine, have been added to the "Kroslok" line of face milling cutters and shell end mills by The Motch & Merryweather Machinery Co., Cutting Tool Mfg. Division, 1250 E. 222nd St., Cleveland 17, Ohio.

Standard cutters in both series range in diameter from 3 through 24 inches. Special cutters in diameters over 24 in. are also available. The

IMPORTANT NOTICE

The Genuine **MAUSER**
VERNIER CALIPER

IS NOW MADE OF
STAINLESS STEEL
THROUGHOUT

\$14.75
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AND THE FOLLOWING
IMPROVEMENTS HAVE BEEN ADDED

- SPECIALLY LONG VERNIER to read thousandths
- HARDENED PHOSPHOR-BRONZE adjustable glib retains accuracy
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Request illustrated folder showing complete line of
MAUSER Toolmakers Calipers, Height Gages, Bevel Pro-
tractors and Tool Stands.

GEO. SCHERR CO., Inc. 200-MM Lafayette St., N. Y. 12

Fine Series utilizes the standard Kroslok blade and wedge which are interchangeable within the respective body sizes of the Fine Series, as well as any other standard body sizes between 3 and 24 in. in diameter. In the Extra Fine Series, the blades and wedges are special in thickness and are interchangeable within their respective bodies only.

Screw Machine Guide Bushing Has Helical Spiral Slots

Carl Hirschmann Co., Inc., 30 Park Ave., Manhasset, N. Y., has announced a unique carbide-lined guide bushing for Swiss-type automatic screw machines. The bushing has been designed with helical spiral slots which are said to not only provide efficient lubrication of the bar, but as they are inclined in the same direction as bar rotation, they also assure a quick



Hirschmann Carbide-Lined Guide Bushings

disposal of any chips which might enter the bushing. Thus, the stock may be held tight without the risk of seizing, providing for maximum efficiency and accuracy of the automatic screw machine.

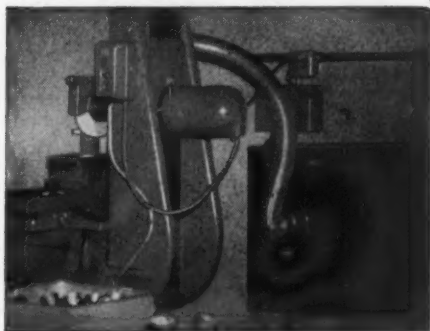
STOP DUSTS *Instantly* with **DUSTKOP**

Available from stock of
22 standard models

300 cfm to 10,000 cfm

for: Surface Grinders, Tool and Cutter Grinders; Polishers and Buffers; Abrasive Belts and Discs; Woodworking and Plastic Industry Equipment . . . DUSTKOPS collect almost all kinds of industrial dusts.

Ask for Catalog 605-2. Describe dust problem for recommendation by return mail—no obligation.



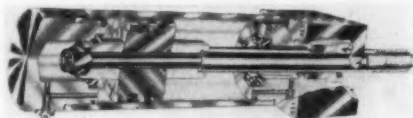
AGET-DETROIT CO.

207 Main St. Ann Arbor, Mich.

Improved Cylinder Is Available for Air or Oil Operation

Improvements in the design of its T-J "Spacemaker" Cylinder which allow for its use with either air or oil have been announced by The Tomkins-Johnson Co., Jackson, Mich. The cylinder is of unusually compact design with solid steel heads and heavy wall seamless steel body (chrome plated) to ensure a high safety factor, sturdy construction and long life.

The cylinder is offered with the same mounting diameter in either an air cylinder or a low pressure hydraulic



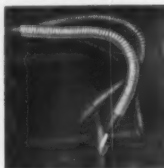
Cutaway view of T-J Improved "Spacemaker" Cylinder

lic cylinder for a maximum of 200 p. s.i. air or a maximum of 750 p.s.i. oil. For air, the cylinder is provided with a fast-acting "super cushion" and for oil with a fast-acting self-aligning cushion.

Other features include hard chrome plated cylinder walls and piston rods; piston rod scrapers; chevron type self-aligning rod packings; extra wide piston of one-piece construction to assure constant alignment and long packing life; and "U" cup sealing and adjusting piston packings to provide a maximum seal with minimum friction.

The cylinder is available in six standard styles of mounting and with bores from 1 through 4 in. and strokes from 1 through 12 in. in even increments of 1 inch. On special order, the cylinder is available in 14, 16 and 18-in. cushioned or non-cushioned models.

"SEALFLEX" TUBING



**Leakproof—
Stays in place**
For Coolants, Cutting
Oils, Solvents

Made of steel with brass fittings—males, nozzles, stopcocks, etc., made in 1/8", 1/4", 3/8", 1/2", 3/4" I.D. Write for bulletin and prices.

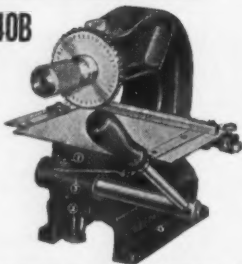
VERMONT FLEXIBLE TUBING CO.
Lyndonville, Vermont

NUMBERALL

CUTS THE COST OF STAMPING NUMBERS

**New Model 40B
NUMBERING
AND
LETTERING
PRESS**

**Mono Wheel—
Automatic
Spacer**



Designed for impressing Letters and Numbers in all kinds of flat metal parts. Stamps plates up to 5" w. x 6" l. Carriage table advances one space with each impression of the dial, like a typewriter, doing rapid work, even spacing and perfect alignment. Different size dials are interchangeable. Direct sight gauge facilitates stamping in the proper space. Write for Bulletin MS40B.

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

GEM MACHINE VISES DO A BETTER JOB!

**IN LESS TIME!
WITH SAFETY
AT LESS COST**



Complete range of sizes. Plain, Swivel and Tilt-ing. For Drills, Mills, Planers, Grinders, etc.

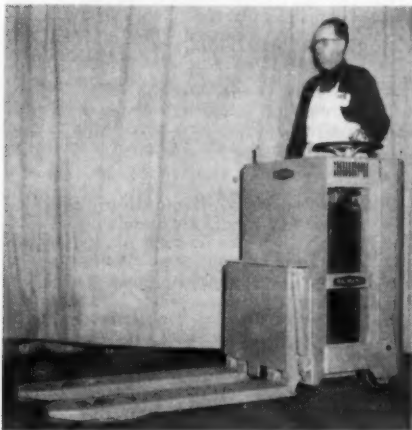
J. E. MARTIN MACHINE CO.

SPRINGFIELD

OHIO

Pallet Truck Features Eight Load Wheels

The Raymond Corp., 88-123 Madison St., Greene, N. Y., has announced that its narrow-aisle, rider-type, electric low-lift pallet truck is now available with eight load wheels, arranged in dual tandem fashion. Each wheel has a diameter of $3\frac{1}{4}$ in. and a face of $2\frac{1}{4}$ inches. According to the manufacturer, the truck has sufficient wheel bearing surface to substantially minimize both wheel and floor wear. The wheels are articulated to



Raymond Narrow-Aisle Electric Low-Lift Pallet Truck

ensure contact with the floor at all times, even when traveling over rough and uneven surfaces. Furthermore, the wheel supporting levers are said to be so arranged that the wheels lift almost vertically. This means that the bottom openings of most pallets will be sufficient for this arrangement.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.

JIG BORING

and

Large Precision Machining

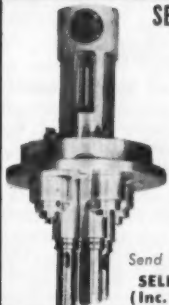
Done to your specifications

We Have 13 Jig Borers

KIDDE PRECISION TOOL CORP.

37 FARRAND ST.

BLOOMFIELD, N. J.



SELLEW Standard Adjustable Drill Heads.

Immediate Delivery.

No. 6-S (2 spin.) min. adj. $\frac{3}{4}$ " max. 2.3"

No. 6-D (2 or 3 spin.) min. adj. 3" max. 4.6"

No. 1-D (2 or 3 spin.) min. adj. 1.16" max. 6.33"

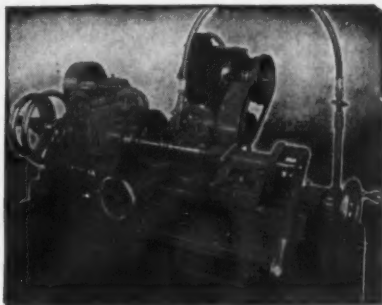
No. 2-D (2 or 3 spin.) min. adj. 1.500" max. $7\frac{3}{8}$ "

No. 1-AC (4 spin.) (cut) min. cir. 2" max. cir. 7"

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THREAD MILLING MACHINE

Also Pinion and Gear Cutting Machines, Cylindrical Sub-Presses, Cutter Sharpening Machines, Small Special Machinery. Cutters for thread milling and gear cutting.

Write for Illustrated bulletin.

WALTHAM MACHINE WORKS, INC.

BOX 48

WALTHAM, MASS.

new literature

1. **Rotary Files.** Rota-File Corp., 1974 66th St., Brooklyn, N. Y., has published a catalog describing its line of ground-from-the-solid rotary files.

2. **Turret Drill Head and Tapper** which are said to speed drill press production are described in a bulletin issued by Chicago Quadrill Co., 1844 Busse Highway, Des Plaines, Illinois.

3. **"Advancing Automation,"** a booklet released by Swartz Tool Products Co., 13330 Foley Ave., Detroit 27, Mich., describes the complete services the Swartz firm offers to builders of machine tools, and outlines their facilities for designing work-holding fixtures.

4. **Conversion Chart**, including seven of the leading jig and fixture component manufacturers, which gives comparative catalog numbers of over 100 items, has been issued by Northwestern Tool & Engineering Co., 119 Hollier Ave., Dayton 3, Ohio.

5. **Attached Blade Milling Cutters, Inserted Blade Milling Cutters, Carbide Slotting Saws and Arbors** are described and illustrated in a catalog published by Millit, Inc., 31 Flint St., Rochester 8, New York.

6. **Hydraulic and Hand Benders** for iron, steel and non-ferrous pipe, conduit and tubing are described in a bulletin issued by Greenlee Tool Co., 1986 Herbert Ave., Rockford, Illinois.

7. **Electronic Gaging Equipment** for dimensional inspection and control applications is described and illustrated in a bulletin (No. 542) available from Cleveland Instrument Co., 735 Carnegie Ave., Cleveland 15, Ohio.

8. **Non-Rotating Power Chuck Fixture** for use on drilling and milling machines, for assembly operations and for other bench and machine installations is described in a bulletin (No. PCF67) issued by The Skinner Chuck Co., 210 Edgewood Ave., New Britain, Conn.

9. **Bending Data Sheets** illustrating actual bending applications and giving details on tooling are available from Pines Engineering Co., Inc., 643 Walnut, Aurora, Illinois.

10. **"Facts About Zirconium,"** a concise compilation of information about the history and production of zirconium has been released by The Carborundum Metals Co., Inc., Akron, New York.

11. **Carbide Blanks and Inserts, Carbide Tools, Boring and Roller-Turner Tools and Toolholders** are described and illustrated in a catalog (No. 109-54) published by Newcomer Products, Inc. Latrobe, Pennsylvania.

12. **Air Operated Devices** are described and illustrated in a catalog issued by Mead Specialties Co., Dept. AA-64, 4114 N. Knox Ave., Chicago 41, Illinois.

13. **Self-Releasing Collets** made of selected steels, properly heat treated and precision ground, are described in a bulletin published by Royal Products Company, 87 Union Street, Mineola, New York.

14. **Precision Centerless Grinders** which may be used for through-feed or in-feed grinding of large or small quantities are described in a bulletin (No. CT-54) released by Landis Tool Co., Waynesboro, Pennsylvania.

USE CARD FOR FREE LITERATURE

15. **Radial Drilling Machines.** Masters, 3613 Archer Ave., Chicago 9, Ill., has issued a catalog describing and illustrating the Arboga line of bench, column and radial drilling machines.

16. **Insert Chaser Die Head.** The Eastern Machine Screw Corp., 40-50 Barclay St., New Haven 6, Conn., has released a bulletin describing and illustrating the H&G Style MM Rotary Type Insert Chaser Die Head. Specifications are included.

17. **Motor Drives.** Reeves Pulley Co., Columbus, Ind., has published a catalog (No. M-543) describing the completely new design of its fractional horsepower Vari-Speed Motodrive. Specifications and line drawings are included.

18. **Pneumatic Throatless Shear** which is capable of making straight, irregular or curved cuts in any metal to 3/16-in. mild or 10-gauge stainless is described in literature released by Beverly Shear Mfg. Co., 3000 W. 111th St., Chicago 43, Illinois.

19. **Punches, Angle Shears, Angle and Sheet Metal Notchers and Deep Throat Punches** are described and illustrated in a catalog (No. 47) published by J. F. Kidder Mfg. Co., Inc., 426 Colchester Ave., Burlington, Vermont.

20. **Floating Holders, "JT" lock and eject collet type**, which are said to compensate for misalignment between the tool and the workpiece on various operations are described in a catalog issued by Scully-Jones & Co., 1909 S. Rockwell St., Chicago 8, Illinois.

21. **Pipe, Conduit and Tube Bending Machines** for any radius up to 180 degrees at standard radius or special radii to specifications are described and illustrated in a catalog released by American Pipe Bending Machine Co., Inc., 14 Furnace St., Poultney, Vermont.

22. **Press Brakes and Dies**, ranging in capacity from 50 through 775 tons, with laminated non-metallic ways are described and illustrated in a bulletin (No. 89C) published by Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, New York.

23. **Adapter Bushings.** H. C. Clatfelter Co., 21810 Wyoming Ave., Oak Park 37, Detroit, Mich., has issued a catalog on "Acro-Grip" Adapter Bushings for gripping drills, reamers and taps accurately in automatic screw machines and turret lathes.

24. **Automatic Truing Device.** Sanford Mfg. Corp., 1022 Commerce Ave., Union, N. J., has released a bulletin describing the Auto-Truer which provides true concentricity as low as 0.0001 in. on chuck or face plate work.

25. **Drill Press Tap Heads** which are capable of producing class 3 and 4 fits on all types of tapping operations are described and illustrated in a catalog published by Snow Mfg. Co., 455 Eastern Ave., Bellwood, Illinois.

26. **Hand Operated Arbor Presses** which range in capacity from 1/4 to 20 tons are described and illustrated in a bulletin issued by Greenerd Arbor Press Co., 41 Crown St., Nashua, N. H.

MODERN MACHINE SHOP

August, 1954

(THIS CARD MUST BE USED BEFORE OCTOBER 1, 1954)

Please send the following literature which I have encircled below:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60

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27. Hand Miller equipped with an air cylinder and Hydro-check for automatic action on milled cut-off work is described in a bulletin issued by H. B. Rouse & Co., 2214 N. Wayne Ave., Chicago 14, Illinois.

28. Grinding Wheel Spindle Bearings. The Cincinnati Milling Machine Co., Cincinnati 9, Ohio, has released a brochure entitled the "X-Ray Story of Filmatic" which presents Filmatic bearings in an interesting and unusual manner.

29. Toolmakers' Microscope for precision shop measurements is described and illustrated in a bulletin (No. 147-50) issued by The Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago 14, Illinois.

30. Perforating Products, including punches, dies, quills, retainers and counterbores, are described and illustrated in a catalog (No. 104) published by Ring Punch & Die Co., Jamestown, N. C. Engineering data are included in the catalog.

31. High Speed Pipe and Tube Cut-Off Machines and Accessories are fully covered in a catalog issued by Continental Machine Co., 1952 N. Maud Ave., Chicago 14, Ill. Specifications and line drawings are included.

32. High Speed Twist Drills in standard or special lengths are fully described and illustrated in a catalog published by Hi-Duty Drill Works, Fleetwood, Pa. A complete price list is included in the catalog.

33. Anti-Scoring Center Point Lubricant for high production is described in a bulletin released by Chicago Mfg. & Distributing Co., 1910 W. 46th St., Chicago 9, Ill. Illustrations of various applications are included.

34. Pull-Up Broaching Machines. A bulletin (No. RU-54) issued by Colonial Broach Co., P.O. Box 37, Harper Station, Detroit 13, Mich., describes the entire Colonial line of pull-up broaching machines. Specifications and dimensional drawings are included.

35. Drilling Coolant Table for all drill presses with self-contained coolant systems is described and illustrated in a bulletin available from Commander Mfg. Co., 4224 W. Kinzie St., Chicago 24, Illinois.

36. Overhead Materials Handling Equipment is fully covered in an engineering and application data booklet (No. 2008-K) published by Cleveland Tramrail Division, The Cleveland Crane & Engineering Co., 6440 E. 282nd St., Wickliffe, Ohio.

37. Flexible Couplings in a wide range of types and sizes to fit all standard applications are described in a bulletin published by Lovejoy Flexible Coupling Co., 4949 W. Lake St., Chicago 44, Ill.

38. Gear Deburring-Chamfering Machine. Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich., has published a bulletin (No. 103-81) describing the Burr-Master Model BMI-14 Universal Internal Spline and Gear Deburring-Chamfering Machine.

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39. Drill Jigs, Fixture Clamps and Fixture Details are described in a circular issued by Slewak Tool Co., 2864 E. Grand Blvd., Detroit 2, Michigan.

40. Relays. Potter & Brumfield, Princeton, Ind., has published a booklet which is a complete reprint of all papers given at the Re'ay Symposium held recently at Oklahoma A&M College.

41. Air Control Valves of the integral pilot operated, remote controlled and direct operated types are described in a bulletin (No. 101B) released by Ross Operating Valve Co., Dept. 1904, 120 E. Golden Gate, Detroit 3, Michigan.

42. Production Feeding Equipment for punch presses is described in a bulletin published by The Wittek Mfg. Co., 4322 W. 24th Place, Chicago 23, Illinois.

43. High Speed Steel stock list (Bulletin SL-2077) consisting of over 800 sizes in five grades of high speed steel is available from Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pennsylvania.

44. Knuckle Joint Presses with capacities ranging from 75 to 10,000 tons in over 40 standard sizes are described in a catalog (No. 12-B) released by E. W. Bliss Co., Canton, Ohio.

45. Layout Drilling Machine to meet the requirements where the ultra-precision of the jig borer is not necessary is described in a catalog (No. 625) released by Cleereman Machine Tool Co., Green Bay, Wisconsin.

46. Multi-Range Flow Control Valves, Direct Operating Pressure Controls and Pilot Operated Check Valves are described in a catalog issued by The Denison Engineering Co., 1160 Dublin Rd., Columbus, Ohio.

47. Three-Dimensional Cam, designated as the "Nerve Center," is described in a bulletin published by The Parker Stamp Works, Inc., Hartford, Conn.

48. "Twist Drill Applications," a chart giving recommendations as to the kind of drill to use in practically all types of metals and materials, has been issued by Whitman & Barnes, 40050 Plymouth Rd., Plymouth, Michigan.

49. Extra Large Impact Sockets, Large Size Extensions and Universal Adapters and Morse Taper Conversion Sockets are described in a brochure available from The Apex Machine & Tool Co., 1027 S. Patterson Blvd., Dayton 2, Ohio.

50. Internal and Universal Hydraulic Grinder, designated as the Model 1024, is described in a catalog (No. 1024B) released by Rivett Lathe & Grinder, Inc., Dept. MM, Brighton 35, Boston, Mass.

51. Safe Feeds and Speeds Chart for high speed drills is available from Chicago-Latrobe, 419 W. Ontario St., Chicago 10, Illinois.

52. Automatic Precision Rotary and Surface Grinding Machines are described in a catalog (No. AG) published by The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio.

53. High Speed Steel Straight Fluted Chucking Reamers are described in a circular (No. 571) available from Pratt & Whitney, Division Niles-Bement-Pond Co., 25 Charter Oak Blvd., West Hartford 1, Connecticut.

54. Straight Side Presses. Dreis & Krump Mfg. To., 7418 S. Loomis Blvd., Chicago 36, Ill., has issued a circular describing "Chicago" Straight Side Presses which have large die areas.

55. A. C. Welder, designated as the Fleetwelder Special, is described in a bulletin released by The Lincoln Electric Co., Cleveland 17, Ohio.

56. Reinforced Resinoid Grinding Wheels are described in a catalog (No. 1748) published by Norton Co., Worcester 6, Massachusetts.

57. Lighting Equipment. Twentieth Century Mfg. Co., Route 176 & Bradley Rd., Box 429M, Libertyville, Ill., has issued a catalog describing the "Unedda" Light.

58. Solenoid Pilot Operated Control Valve, designated as the "Speed King," which is designed to meet J.I.C. standards is described and illustrated in a bulletin (No. SKJ-54) issued by Valvair Corp., 454 Morgan Ave., Akron 11, Ohio.

59. Face Milling Cutters and Shell End Mills, designated as "Kroslok," are described and illustrated in a bulletin (No. 101-CT) issued by The Motch and Merryweather Machinery Co., Cleveland 17, Ohio.

60. Flute Grinder which will handle right and left-hand taps from the smallest to $\frac{1}{2}$ -in. diameter with 2, 3 or 4 flutes is described in a bulletin (No. 654) released by Edward Blake Co., 438 Cherry St., West Newton 65, Mass.



USE CARD FOR FREE LITERATURE

metalworking news in brief

Louis F. Polk, chairman and president of the board, The Sheffield Corp., Dayton, Ohio, has been nominated to serve as a director-at-large of the American Society of Mechanical Engineers. Upon his acceptance, after a letter ballot of the society's 38,000 members, Mr. Polk will be installed at the annual meeting in New York scheduled to be held later this year.

— o —

Neal L. Cobb, chief of tool design, has been appointed chief engineer of The Fellows Gear Shaper Co., Springfield, Vermont.

— o —

Three appointments involving sales, engineering and production have been announced by Super Tool Co., Detroit, Mich. **Milton J. Steffes**, formerly sales manager, has been named chief engineer in charge of all design, field engineering development and new product engineering. **Kenneth R. Fisher**, carbide tool field sales representative, succeeds Mr. Steffes as sales manager and will not only handle sales policy applying to both standard and special tools, but will spend a major portion of his time in the field working with representatives, distributors and users of Super tools. **Louis B. Szal** has been promoted to works manager. Mr. Szal, who has been associated with Super since 1937, will have charge of all production and shop personnel in both the Detroit and Elk Rapids plants of the company.

Donald M. Laflin, vice president in charge of sales, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has been elected a vice president of Amertool Services, Incorporated, at the annual Amertool meeting in Mexico City. Mr. Laflin, who has been associated with Giddings & Lewis for more than 20 years, was named to the vice presidency of Amertool by the 15 major machine tool builder companies who own and operate Amertool Services for the purpose of supplying engineering and machine tool application service to manufacturers in Japan, Mexico, South America and Germany.

— o —

Jones & Lamson Machine Tool Co., Springfield, Vt., has announced the appointment of **Rickert Industrial Supply Co.**, 614 W. Michigan St., Milwaukee 1, Wis., as a stocking distributor of J&L automatic opening die heads, chasers and fixtures. Rickert will completely cover the eastern Wisconsin and northern Michigan territory.

— o —

The Warner & Swasey Co., Cleveland, Ohio, has announced the appointment of **Lester M. Cole** to the position of general sales manager, with headquarters at the main office in Cleveland. In his new capacity, Mr. Cole will have general responsibility for the sale of all company products, including machine tools, textile machinery and construction machinery.

Metalworking News in Brief

Ready Tool Co., Bridgeport, Conn., has announced the appointment of **Littlejohn Co.**, 4511 Melrose Ave., Los Angeles, Calif., as its representative in southern California, Arizona and southern Nevada.

— o —

The Producto Machine Co., Bridgeport, Conn., has announced the appointment of **T. J. Rancont** as district sales manager of the Detroit branch. Mr. Rancont will be in charge of the newly acquired Producto headquarters building located at 10200 Capitol Avenue, in Detroit, which has been equipped with complete and up-to-date facilities for the manufacture of catalog and special die sets.

— o —

Earl A. Oldham has been appointed a representative for The Lufkin Rule Co., Saginaw, Mich., in San Francisco, northern California and Nevada.

Raymac Mfg. Co., Detroit, Mich., has announced the appointment of **Owen P. Langworthy** as general manager of the company, taking over the duties of **L. A. Whitmore**, who is taking a leave of absence because of ill health.

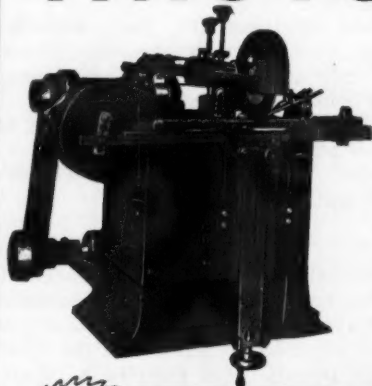
— o —

Clearing Machine Corporation has appointed **Earl F. Mayer** as controller of its division in Hamilton, Ohio. Mr. Mayer was formerly auditor in the company's Chicago plant.

— o —

Robert L. Boggs has been appointed sales engineer for the Butterfield Division, Union Twist Drill Co., Derby Line, Vt. Formerly associated with the Hughes Aircraft Company, Mr. Boggs will work in conjunction with **R. B. McKenzie**, representing Butterfield in the southern California territory, with headquarters at the Los Angeles branch office located at 3675 East Olympic Boulevard.

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by sharpening just one gross of hack saw blades

You can resharpen a gross of hack saw blades at least 6 times—actually saving you the price of this machine.

WARDWELL MODEL EC COMBINATION GRINDER is the only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

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PORTER OFFERS YOU:

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2. Bar & Rod Grinding Facilities.
3. Screw Machines (Brown & Sharp).
4. Swiss Automatic Screw Machines.
5. Complete Secondary Operation.
6. Heat Treat and Plating.
7. Centerless Grinding Facilities.
8. Precision Inspection.
9. Proper Packaging.
10. Shipment — when and how you want it.

**FROM START TO FINISH—YOU'RE BETTER
OFF WITH PORTER Prove it — today!**

PORTER MACHINE CO., INC.

**3100 ENYART AVENUE
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Metalworking News in Brief

Dayton Rogers Mfg. Co., Minneapolis, Minn., has announced the appointment of **Oscar Hood** as sales engineer for the states of Texas and Oklahoma. With headquarters located at 3321 Fairfield Ave., Ft. Worth, Texas, Mr. Hood will represent the company's line of pneumatic die cushion equipment, stampings and plastics for the metal trade industries.

— o —

Frank W. Ladky, district sales manager for Allegheny Ludlum Steel Corporation in Milwaukee, Wisconsin, has been appointed assistant to the president. Mr. Ladky has represented the firm in Wisconsin for the past 34 years. Succeeding Mr. Ladky will be **David L. Garlick**, who has been connected with the Milwaukee office since he joined the company in 1936.

— o —

Warner & Swasey Co., Cleveland, Ohio, has announced the retirement of **Donald M. Pattison**, who was vice president in charge of sales for the past seven years.

— o —

Reid Brothers Co., Inc., Beverly, Mass., manufacturer of surface grinders, has announced the appointment of **Fuchs Machinery and Supply Co.**, 2401 N. 11th St., Omaha, Neb., and **Gross Machinery Co., Ltd.**, 18-24 Jarvis St., Toronto, Ontario, as authorized distributors.

— o —

Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn., has announced the appointment of **Raymond S. Fox** to the position of chief engineer consultant of the P&W Gage Division and **Charles A. Whitney** to chief engineer of the P&W Gage Engineering Department. Mr. Fox was formerly chief engineer of the Gage Engineering Department, and Mr. Whitney was assistant chief engineer of the Gage Department.

Metalworking News in Brief

Masters Machinery Supply Co., Chicago, Ill., has been named exclusive distributor of the Arboga Vertical Mill. Masters is also the exclusive midwestern distributor for the entire line of Arboga radial and column drilling machines.

— o —

Robert J. Sutton has been appointed treasurer and secretary of Atkins Saw Division, Borg-Warner Corp., Indianapolis, Ind. The company has also named **Ellery Levitts** assistant treasurer and **Howard O. Wiesen** assistant secretary.

— o —

The Cincinnati Shaper Co., Cincinnati, Ohio, has announced the promotion of **Frank Pfefferle** as special products manager. In his new position, Mr. Pfefferle's duties will involve special work primarily in the fields of new product development and market research. The company has also announced the appointment of **Alfred Baumgartner** as sales manager and **Joseph Warren** as advertising manager.

— o —

The Babcock & Wilcox Co., New York, N. Y., has announced the appointment of **N. J. Connor** as manager of its New York district office, replacing **H. E. Martin** who has resigned. Mr. Martin, who has been manager of the district since 1942, has been elected president and a director of Metal & Thermit Corporation.

— o —

W. H. Eisenman, national secretary of the American Society for Metals for the past 35 years, has been nominated for his 19th consecutive two-year term. The seven-man nominating committee for A.S.M. national secretary is made up of the A.S.M. president and the six immediate past presidents of the society.

The **R. K. LeBlond Machine Tool Co.**, Cincinnati, Ohio, has announced that its Chicago district office has moved from 20 N. Wacker Drive, Chicago, to new quarters at 6429 W. North Ave., Oak Park, Illinois.

— o —

Sherman R. Lathrop, service representative for Onsrud Machine Works, Inc., Chicago, Ill., died recently at the age of 57 years in London, England. Mr. Lathrop had just completed a business tour of various manufacturers in Sweden, France and England, setting up machines for them.

— o —

The appointment of **J. B. Henry, Jr.**, as manager of the newly-created Architectural Division has been announced by Allegheny Ludlum Steel Corp., Pittsburgh, Pa. The new division was established as the result of a continually heightening interest of architects and builders in stainless steel as a building material.

SOLD THRU LEADING SUPPLY HOUSES



GROBET CENTERLESS COUNTERSINKS

Six staggered cutting edges give shearing cut that eliminates all chatter.

Send for catalog BC1.

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421 Canal Street N. Y. 13, N. Y.
New York • Chicago • Montreal

Metalworking News in Brief

Tool Box Sales Co., 1356 Kingsland Ave., St. Louis, Mo., has been appointed exclusive metalworking machinery representative in the St. Louis area for Onsrud Machine Works, Inc., Chicago, Illinois.

— o —

A. R. Williams Machinery Co., Ltd., 64 Front St., Toronto, Canada, has been appointed Canadian sales representative for "Wespo" toggle clamps by West Point Mfg. Co., Detroit, Michigan.

— o —

Michigan Powdered Metal Products Co., Inc., Northville, Mich., has announced the election of **V. Leonard Hanna** as a director, as well as treasurer, of the company to replace **Jules F. Halm**, retired. Mr. Hanna is also controller of the company.

Charles H. Crawford, formerly associated with Mack Truck Company, has been appointed plant manager by Colonial Broach Co., Detroit, Mich. Mr. Crawford was plant manager of Mack's New Brunswick, New Jersey, plant.

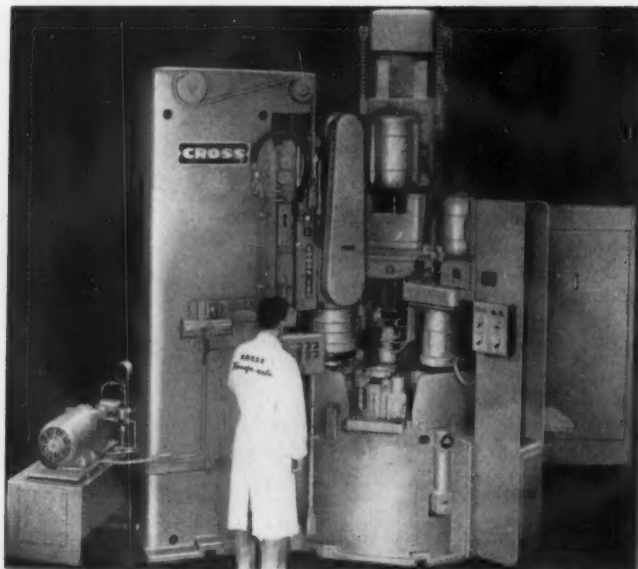
— o —

Norma-Hoffmann Bearing Corp., Stamford, Conn., has announced the appointment of **Dr. Harry Walker** as vice president in charge of the newly-formed Walker Division which engages in the manufacture and sale of selenium and other types of dry disc rectifiers.

— o —

Threadwell Tap & Die Co., Greenfield, Mass., has announced the appointment of **Al E. Knazek** as its district sales and service manager for the Cleveland, Akron, Canton and Erie area.

Dial Type Machine for Processing Transmission Shaft Supports



THE special dial type machine tool illustrated herewith is used by a large automotive transmission producer to bore, drill, ream and tap aluminum transmission shaft supports. Developed by The Cross Company of Detroit, the machine turns the rear face, counterbores the large pilot diameter, drills six holes, drills and reams two locating holes, and chamfers and taps five holes. Production is 128 castings per hour at 100 per cent efficiency.

Metalworking News in Brief

Allied Products Corp., Detroit, Mich., has announced the retirement of **Jules F. Halm**, treasurer and assistant secretary, after 23 years of service with the corporation. **V. Leonard Hanna**, controller, assumes the additional duties of treasurer, following his election to that office, and **Peter C. Fortune**, who has been with Allied for the past four years in public relations, sales promotion and advertising activities, has been appointed assistant secretary.

— o —

Fitzhugh Lee Kirk, assistant sales manager on special Unbrako products, has been appointed wage and salary administrator at Standard Pressed Steel Co., Jenkintown, Pa. The company has also announced that **Robert H. Clare**, former head of the Scientific Gage Co., Detroit, Mich., has been assigned to its 11-state west coast sales territory.

— o —

Adamas Carbide Corp., Kenilworth, N. J., has announced the appointment of **E. G. Collins**, Production Tooling Service, 422 N. 24th St., Birmingham, Ala., as its sales representative for the states of Alabama and Tennessee.

— o —

E. W. Bliss Co., Canton, Ohio, has announced the appointment of **Samuel J. Lombardo** as a sales engineer at its Philadelphia district office. Mr. Lombardo was formerly associated with the Quaker Rubber Division of H. K. Porter Company and with Brown Instrument Division of Minneapolis-Honeywell Regulator Company.

— o —

The Equipment Co., Detroit, Mich., has announced the advancement of **E. C. Castor** to the position of general sales manager. Mr. Castor was formerly Michigan sales engineer for the past seven years.

The Denison Engineering Co., Columbus, Ohio, has announced the appointment of **Robert A. Monague** as field engineer for the company's Tulsa, Oklahoma, office.

— o —

The appointment of **Stephen J. Morris** as general purchasing agent has been announced by Morse Chain Co., Detroit, Mich. Mr. Morris, who has been purchasing agent for the company's Ithaca, New York, manufacturing plant, will now head purchasing operations for both the Detroit and Ithaca plants.

— o —

Micrometrical Mfg. Co., Ann Arbor, Mich., has appointed the following firms as Profilometer representatives: **Overgard Machine Tool Co.**, Denver, for Colorado, Montana, New Mexico, Wyoming and southwestern South Dakota; **The Mine and Smelter Supply Co.**, Salt Lake City, covering Utah, Nevada and southeastern Idaho; **Quality Control Co.**, Los Angeles, for Arizona and southern California; **Darling Abrasive and Tool Co.**, San Francisco, for northern California; **The Portland Machinery Co.**, Portland, Oregon, for Oregon and southern Washington; **H. F. Soderling Co.**, Seattle, for northwestern Idaho and northern Washington; and **Williams & Wilson Ltd.**, for all of Canada, with offices in Windsor, Toronto, Montreal and Quebec.

KENNAMETAL CUTTING TOOLS

for Increased
Productivity

KENNAMETAL Inc.
LATROBE, PA.

**CEMENTED CARBIDE TOOLS,
BLANKS, MILLING CUTTERS**



Metalworking News in Brief

The appointment of **William T. Cherry** to the position of manager of application engineering has been announced by the Formsprag Co., Van Dyke, Mich. Mr. Cherry has been associated with Formsprag's production, engineering and sales departments for the past five years. **Robert B. Madonia** has been named to assume Mr. Cherry's former duties.

— o —

Basco Mfg. Co., Stamford, Conn., has announced the appointment of **E. V. Nielsen, Inc.**, 129 Broad St., Stamford, Conn., as its international sales agent. The Nielsen firm, headed by **E. V. Nielsen** as president and general sales manager, will be responsible for all sales of the full line of magnet separators in all parts of the world.

— o —

Wales-Strippit Corp., North Tonawanda, N. Y., has announced the election of **Paul H. Taylor** as a director and vice president in charge of the Research and Hydra Spring Divisions.



Three promotions have been announced in the Carbide Division of Firth Sterling Inc., Pittsburgh, Pa. **M. L. Backstrom** has been promoted to assistant sales manager and is succeeded in his former post of chief engineer by **W. E. Montgomery**. **John Gabrenas** has been named assistant chief engineer.

— o —

Dayton Rogers Mfg. Co., Minneapolis, Minn., has announced the appointment of **William H. Powell** as sales engineer for the upper northern section of New York State, with headquarters at 49 Dorchester Rd., Rochester, N. Y. The company has also announced the appointment of **D. R. Pennington**, Commonwealth Sales Company, as sales engineer for the western part of Pennsylvania, with headquarters at 214 Park Place, McKnight Village, Pittsburgh, Pennsylvania.

— o —

The appointment of **Bryant Machinery and Engineering Company** as midwest sales representatives has been announced by Henry & Wright, Division Emhart Mfg. Co., Hartford, Conn. Operating from its Chicago (640 W. Washington Blvd.) and Milwaukee (647 W. Virginia St.) offices, Bryant's territory will comprise Iowa, most of Wisconsin, northern Illinois and northern Indiana.

— o —

Manufacturers Equipment and Supply Co., Flint, Mich.; **Schuman Steel Products Co.**, Bellingham, Wash.; and **Jack Lee Machine and Supply Co.**, Attalla, Ala., have been named distributors by Morse Chain Co., Detroit, Mich. Each firm will handle the complete line of Morse products, including roller and silent chain drives and sprockets, cable chain, flexible couplings, driveshafts and clutches.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.

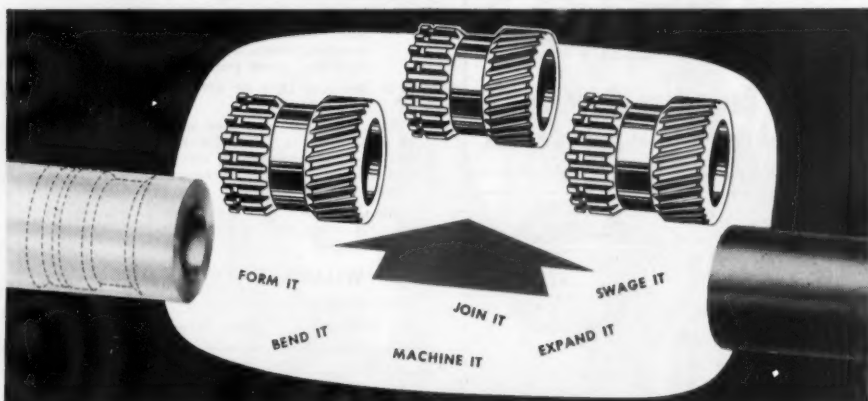
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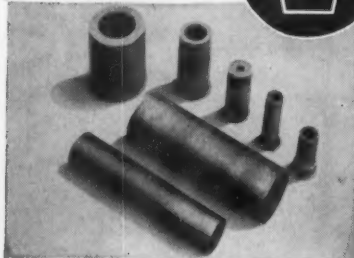
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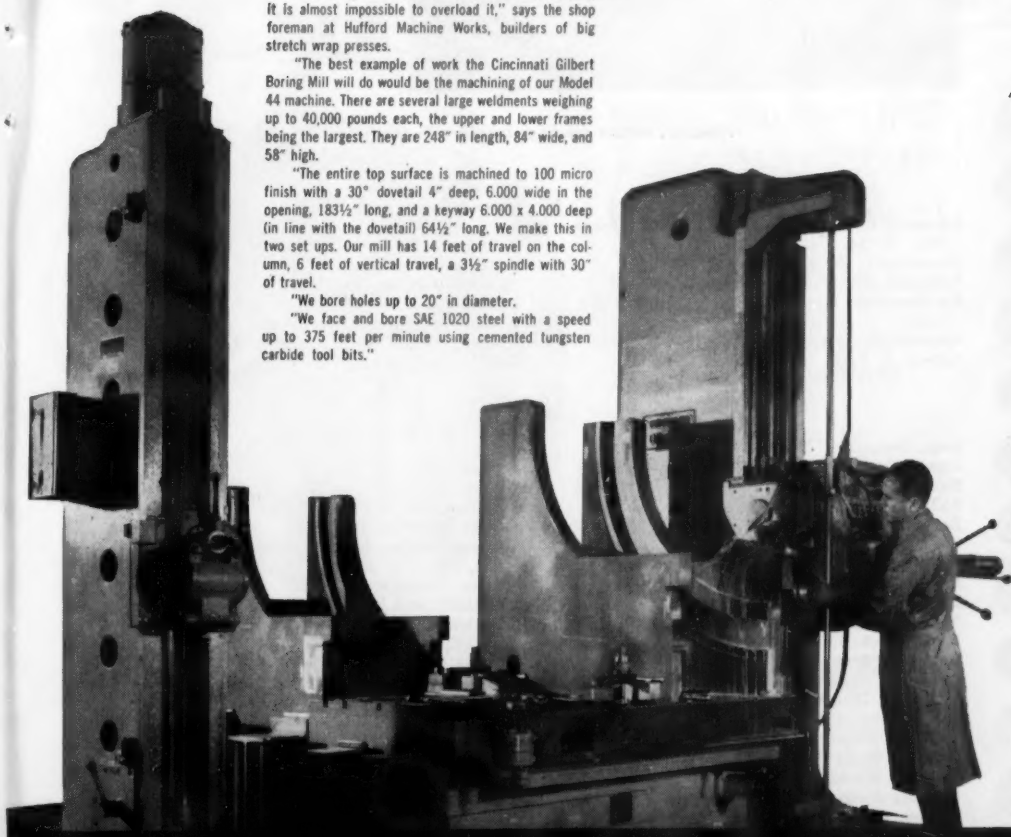
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"The best example of work the Cincinnati Gilbert Boring Mill will do would be the machining of our Model 44 machine. There are several large weldments weighing up to 40,000 pounds each, the upper and lower frames being the largest. They are 248" in length, 84" wide, and 58" high.

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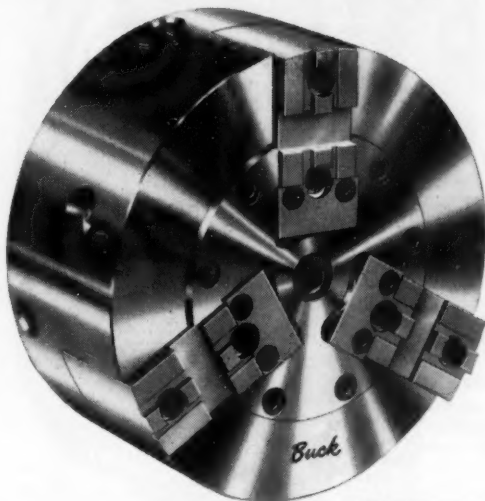
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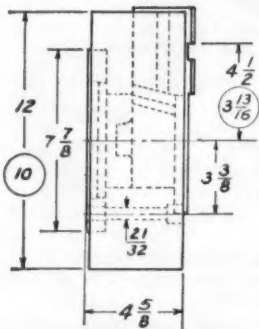
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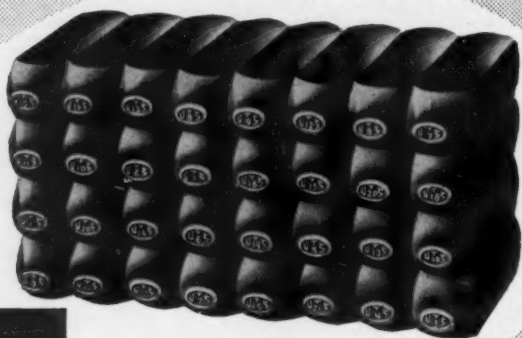
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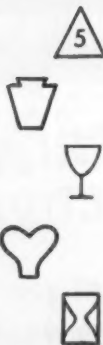
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the last word

The Price We Pay

FROM the many letters we receive each month, we are continually made aware of the fact that many of the readers of Modern Machine Shop are as keenly interested in the economic problems which affect the country as a whole as they are in the production problems involving their jobs. We believe this to be a healthy condition because the metal-working executive who is conscious of economic problems is one who will more than likely display a more full understanding toward the production job at hand.

We consider it a privilege to be able to pass along information pertaining to economic subjects which might prove helpful. On the matter of taxes, for example, we think all readers will be interested in the facts and figures which were gathered together by Dr. George S. Benson, Director, National Education Program. We quote his presentation here-with:

Thomas Jefferson, while commenting on heavy taxes, said: "The purse of the people is the seat of sensibility. Let it be drawn upon largely, and they will listen to truths which could not excite them through any other organ." Well, everybody's purse today is being "drawn

upon largely." But are enough of us aware of just how heavily we are being taxed to bring about action toward reducing the heavy drain on our pocketbooks and on the very vitality of our productive economic system?

It is now estimated that the average John Doe taxpayer has to pay out more in taxes than he spends on food for his family. When we average up all families, regardless of size, whose breadwinners had incomes of \$3,500 a year in fiscal 1953, we find that the average family paid \$836 in direct and indirect federal taxes, and \$262 in state and local taxes. The total was \$1,097 or \$91.40 a month. This is 31.3 per cent of income.

The family head who made \$4,500 in the same year paid \$1,148 in federal taxes, and \$346 in state and local taxes for a total of \$1,494—or 33.2 per cent. The family with a \$7,500 income for fiscal 1953 paid \$2,801 in taxes, or 37.3 per cent of income. The family with a \$15,000 income paid \$6,618 in taxes, or 44.1 per cent of income.

Business corporations paid taxes on the average of 10.5 per cent of gross sales receipts. The taxes were more than three times larger than the dividends paid by the companies, from which the

average figures were compiled and more than four times larger than their retained earnings or net profit.

Admittedly we live today in an atmosphere of international tension. We need to spend adequately for national defense. But who can say with conviction that \$7 billion couldn't be cut from the proposed \$37.5 billion Department of Defense appropriation and at least one billion cut from the \$4.3 billion for "mutual military aid program?" And who can prove to the hard hit taxpayers that, in these critical times, when the economical health of our nation is so vitally important, a

substantial savings couldn't be made in the proposed \$20 billion for "other expenditures?"

The health of our private enterprise system is at stake. No longer can businessmen ask solely about a proposed policy or action, "Is it sound?" They must ask, "What is the effect on our tax position?" Progress, in many cases, is being halted. Not enough capital is left after taxes to create enough new jobs for youth. These are true facts. They should move all citizens to demand an immediate, drastic cut in the size and cost of government.

The Peacetime Atom

FIFTEEN years ago it would have been difficult to find 500 men in all of the United States who could discuss with any degree of clarity about what went on inside of the atom. Today, we have a total of 3,400 institutions and about 15,000 persons using radioactive material. Among them are 860 industrial firms using radioisotopes for performing production jobs easier, faster, or cheaper.

These jobs involve radiographic inspection, thickness or density gaging, processes involving friction and wear, and so on. The use of isotopes for industrial applications does not require particularly elaborate equipment or a large capital outlay. Facilities for radiographic inspection, for example, involve an out-

lay of less than \$500. A completely equipped laboratory for radioisotope investigations in process control and in research can be set up for \$1,500 to \$3,000, depending upon the quantities used. The cost of radioisotope thickness gages ranges from about \$4,000 to \$8,000, depending upon whether the gage is used simply to measure and record the thickness or also to control a process just ahead of the thickness gage.

For those readers who might be interested in obtaining information pertaining to the industrial uses of the peacetime atom, we would suggest inquiries be directed to Research and Industrial Development, United States Atomic Energy Commission, Washington 25, D. C.

Fred W Vogel

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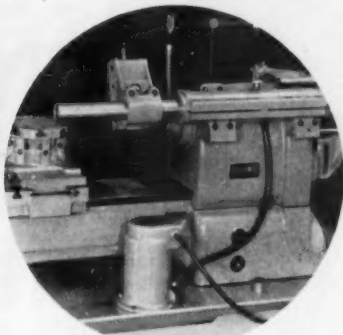
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COOLANT
PUMPS**



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1817 READING ROAD

CINCINNATI 2, OHIO

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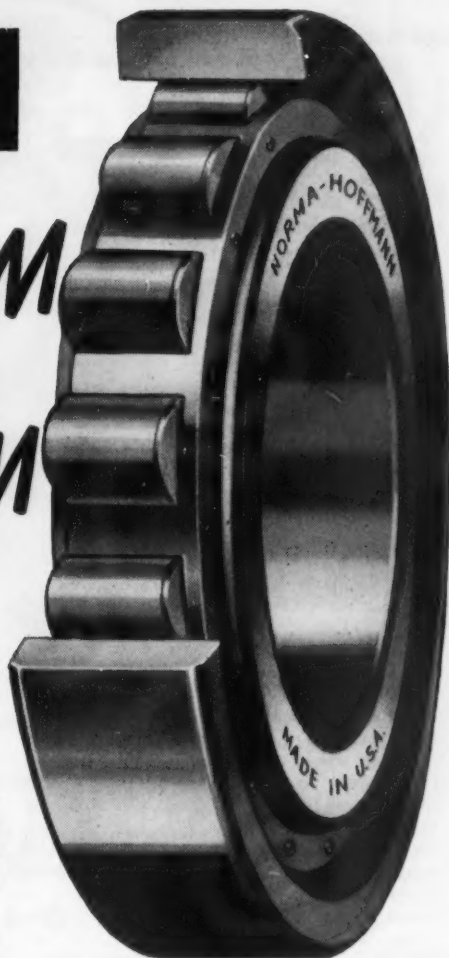
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PRECISION MADE
Roller Bearings

*Give you
MAXIMUM
Capacity in
MINIMUM
Space*

And equally important — they are interchangeable with single-row ball bearings

If your bearings must operate under such severe conditions as high speeds, heavy loads, temporary overloads, shock or vibration, then *Norma-Hoffmann Roller Bearings* are the ones to use. Here's why —

- Solid cylindrical rollers between cylindrical races provide maximum load contact area, increased steady load capacity, and a larger shock-absorbing capacity than any other type of single-row bearing.
 - A safety factor margin ample for temporary overloads up to 50% beyond normal rating, as under peak loads, in unusually severe duty, or under shock conditions.
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- A lower friction coefficient under heavy load than any other type of bearing permits.
- Speedability equal to that of any ball bearing, size for size, up to 35,000 R. P. M.

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BALL • ROLLER • THRUST

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MILLING MACHINE VISE



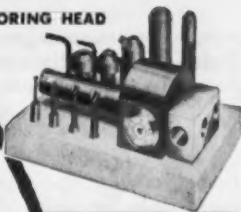
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For right angle milling and drilling narrow, deep molds and cavities.



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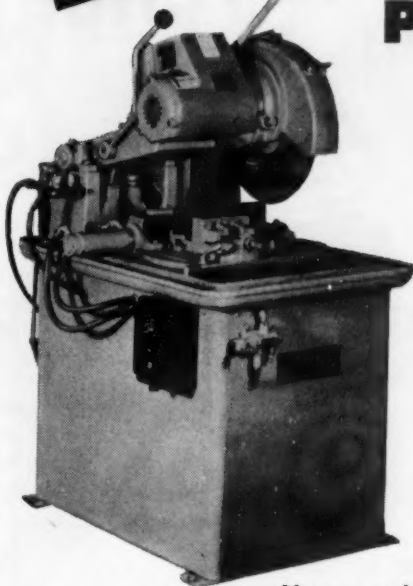
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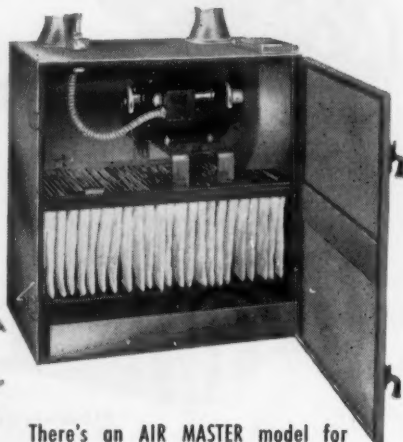
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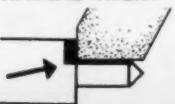
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Increased life, better performance for practically all end and side cutting tools is now possible. New design gives traverse, not rocking, action with tool remaining on wheel center. Set-up so fast and simple you can standardize on this better grind for tools of 1 to 16 flutes. Easy cam interchange — selective degree of relief without changing cams.

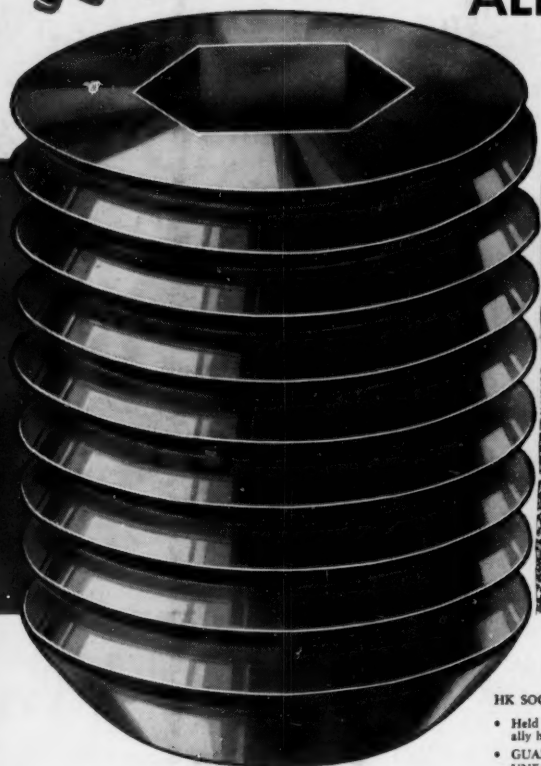
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ROYAL OAK, MICH.**

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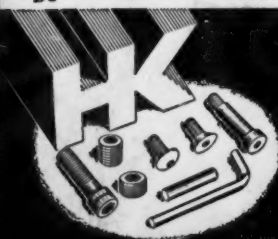


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HOLO-KROME *Completely Cold Forged* **SOCKET SCREWS**

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AUGUST

MODERN MACHINE SHOP

1954